American Machinist

A McGraw-Hill Publication . . . Established 1877

New York, May 29, 1930

*

Edward T. Birdsall, *one of the founders and the first secretary-treasurer of the S.A.E.*

Coker F. Clarkson, *for twenty years S.A.E. secretary and general manager*

S. A. E. Celebrates Its Silver Anniversary

By Herbert Chase

Associate Editor, American Machinist

From seven pioneers to a thriving organization with over 7,000 members in 25 years—such is the enviable record established by the Society of Automotive Engineers. Its growth has paralleled and had a pronounced effect upon the automotive industry, with which it has co-operated, but without the least semblance of commercial dictation, since its inception.

Now that the Society has reached and celebrated its Silver Anniversary, it is a fitting time to review its history and accomplishments for they have been of great value, not alone to its own membership, but to nearly all metal-working industries.

Without doubt, a considerable share of the credit for the inception, founding, and establishment of the Society rests with its first secretary and treasurer, Edward T. Birdsall. As early as 1902 or 1903 the idea of establishing a society or institute of automobile engineers was discussed informally by various engineers who felt the need for frank interchange of knowledge and ideas relating to automobiles. These vehicles were then in a comparatively crude state as compared to present vehicles, as some of the accompanying photographs indicate.

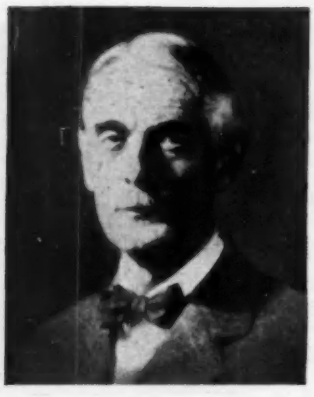
With assurance of support from two leading automobile publications of that day, preliminary meetings of interested engineers were held in New York during 1903, and at the Hotel Navarre, New York, Jan. 18, 1904, during the automobile show, a decision to form an automobile engineering society was reached. At that time an informal organization was effected by naming Andrew L. Riker, engineer of the Locomobile Company, president; Henry Ford, vice-president; John Wilkinson, of the Franklin Company, second vice-president; and Mr. Birdsall, secretary-treasurer. Horace M. Swetland, A. H. Whiting, and Mr. Birdsall were named a committee to draft a constitution, and this committee decided upon the name "Society of Automobile Engineers."

Under the constitution written by this committee, the same officers were formally elected at a meeting in New York in January, 1905. In addition, A. H. Whiting, L. T. Gibbs, H. M. Swetland, Hiram Percy Maxim, and H. W. Alden were elected to the board of managers. By April first of that year the society membership

Andrew L. Riker, first president of the society (1905-07), and Howard E. Coffin, who, as fourth president, helped put the S.A.E. "on the map"

Charles M. Manly, pioneer in aviation, and first of the S.A.E. presidents from the aircraft field. Col. Jesse G. Vincent, Liberty engine designer and fifteenth president

Henry Souther, fifth president, and father of S.A.E. standards work. Charles F. Kettering, the Society's war-time president, who aroused its interest in research



Henry M. Crane, dean among automobile designers and the nineteenth S.A.E. president. Edward P. Warner, formerly Assistant Secretary of the Navy, now president

numbered thirty, and by the end of the same month fifty new membership applications were received. Not until Jan. 16, 1906, was there held the first meeting at which papers were presented, at New Grand Hotel, New York.

GROWTH of the newly formed Society seems to have been retarded in its early years by almost simultaneous establishment of the Mechanical Branch of the Association of Licensed Automobile Manufacturers. In this branch were included the engineers of all companies in the licensed association, which comprised nearly all the larger automobile manufacturers except the Ford Motor Company. Outside engineers were not admitted to the Mechanical Branch meetings, but the branch included so large a proportion of qualified American automobile engineers that some failed to see the need for a second and independent organization.

The Mechanical Branch started certain very important standardization work and soon adopted a standard fine-pitch screw thread for bolts from $\frac{1}{4}$ to 1 in. in diameter and compiled certain information regarding steel and non-ferrous metals which later became the basis for S.A.E. steel and non-ferrous metal specifications, now known and used the world over. This work, in addition to various testing which A.L.A.M. members required, was fathered and prosecuted by Henry Souther, who was one of the leading metallurgists of his day.

Although there was no direct rivalry between the S.A.E. and the Mechanical Branch, the latter, backed by funds and by so many important manufacturers, had much more to offer its members at that date than the S.A.E. But better days for the Society were at hand.

Before the S.A.E. could boast any officers or staff of its own, most of its earliest records were lost. It appears that at least three meetings were held in 1907, one of them a joint meeting with the A.S.M.E. in Detroit. In this year Mr. Birdsall found that his duties as secretary-treasurer made more demands upon his time than he could give, and tendered his resignation. At this time, writes Mr. Birdsall, the society "had about 100 members in good standing, and about 150 lying down." Late in the year Thomas J. Fay was elected president and Charles B. Hayward secretary. They held office during 1908, and were succeeded respectively by Henry Hess and Alexander Churchward who were elected at the January, 1909, meeting.

In the summer of 1909 the first of the society's semi-annual meetings combining technical sessions and recreation was held. These summer meetings since then have become a regular feature of S.A.E. activities and have done much to promote lasting acquaintances and a free interchange of information among its members.

AT the winter meeting of 1910 came the fortunate election of Howard E. Coffin to the presidency of the society, then numbering about 400 members. He immediately saw the need for a Secretary and General Manager who could give his entire time and efforts to building up the organization and making it of use to members.

Despite a lack of funds (afterward obtained through the generosity of a few members) Mr. Coffin decided to employ a general manager and made the happy choice of Coker F. Clarkson, who, as assistant manager of the A.L.A.M. had acquired an excellent knowledge of the

automobile industry and had been closely identified with the A.L.A.M. Mechanical Branch. Mr. Clarkson has this year completed two decades in the position of general manager. To his ability and to his painstaking and thorough work the society owes no small measure of its success.

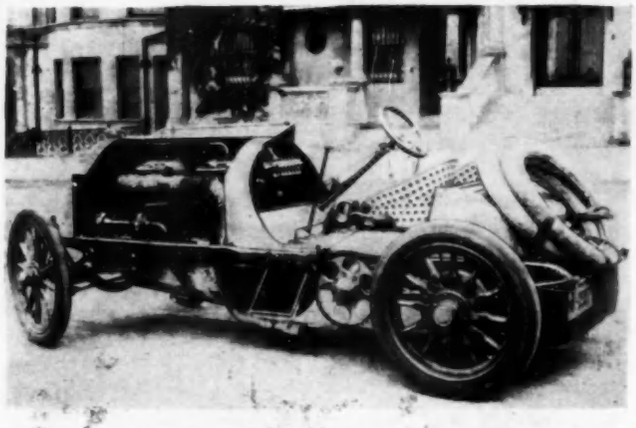
IN addition to establishing the society in offices of its own with a paid staff, Mr. Coffin's administration formed a Standards Committee under the able direction of Henry Souther and thereby instituted a work which since has gained for the society, on this score, a record probably unequaled by any other engineering society. S.A.E. standards work has been heartily supported by the automobile industry, both morally and financially, and has in turn saved the industry many millions of dollars.

Another important step taken by the society during 1910 was its decision to publish its proceedings and handbook of standards, thereby giving members printed records of its meetings. By the end of 1910, which was marked by a successful summer meeting in Detroit, the membership of the Society had reached six hundred.

Doubtless the work of the Society received further impetus in 1910 as a result of the dissolution of the A.L.A.M. along with its Mechanical Branch, when court rulings declared invalid the famous Selden patents upon which that association was built. In any event, the S.A.E. inherited the standardization work started by the Mechanical Branch and carried it on from that important, though small, beginning. The society also inherited the records of the Mechanical Branch.

Thanks in part to his efficient work as chairman of the standards committee, Henry Souther became Mr. Coffin's successor as president in 1911 and continued similar policies. The annual meeting of that year was held in the automobile Club of America, one session being staged in the dynamometer laboratory where the writer of the present article had begun research work, many records of which were presented later before the society. This meeting was followed by another successful summer meeting in Dayton, Ohio. There many members were guests of the Wright brothers who entertained them with flights in one of their early planes.

Although known up to 1917 as the Society of Automobile Engineers, the constitution of the society never contemplated a narrow interpretation of the term "automobile," for it was the belief of both founders and other members that its activities should include self-propelled vehicles and internal combustion engines of all types. Interest in the work of the Wright brothers was only one of many indications that the society, even in its early days, was truly automotive in character if not in name.



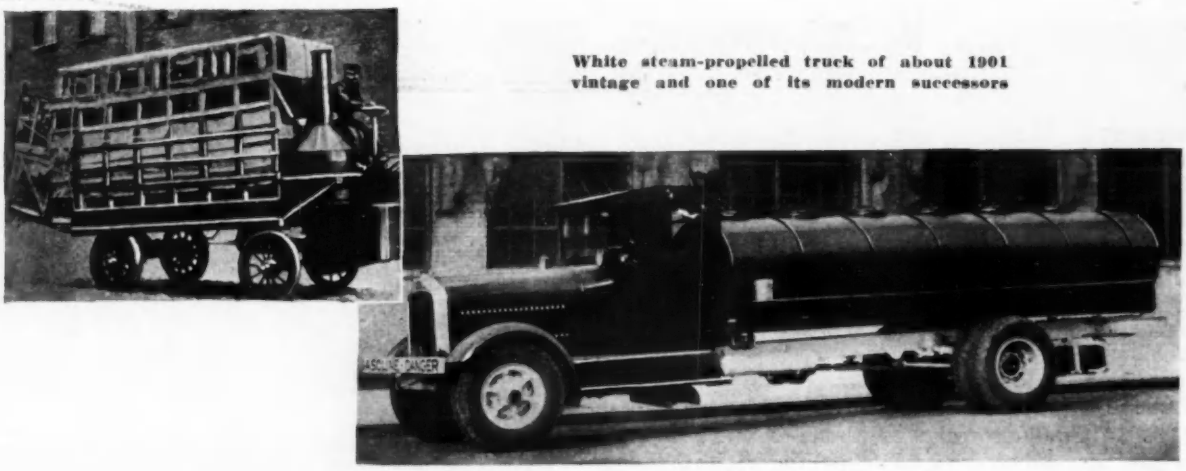
Locomobile Vanderbilt Cup racer of 1905. Chain drives were not uncommon at that time

Andrew L. Riker, Locomobile designer, Joseph Tracy, driver, and Alfred J. Poole, early members of the S.A.E.

1930 Packard phaeton and one of its prototypes of about the date when the S.A.E. was founded

Late in 1911 some forty members of the society participated in a trip to England where they were entertained by the British Institution of Automobile Engineers, with which most friendly relations had been established. These members also visited many automobile factories in England and France, and, upon their return to New York presented papers concerning their observations at the annual (1912) meeting of the society. A group of British automobile engineers returned the "call" made by members of the society and were guests of the society at its 1913 summer meeting.

Beginning in 1910, the membership of the society experienced a rapid and healthy growth which has continued almost unabated to the present date. Its standards work became increasingly important and diversified, and to foster more frequent contact between members, numerous local sections were formed, starting with the Metropolitan Section in 1911. Today the society has some



White steam-propelled truck of about 1901 vintage and one of its modern successors

twenty sections, including three on the Pacific coast, one in Canada and one in each of many automotive centers.

By 1916 the society had extended its work not only geographically but into all branches of the automotive industry. Despite this fact separate organizations known as the American Society of Aeronautic Engineers and the Society of Tractor Engineers had been formed with considerable overlapping in function. Many S.A.E. members felt that these newer societies well might be merged with the S.A.E. with the understanding that increasing attention should be given to work in their respective fields. Such a merger was brought about during 1916 and 1917 and the name of the Society of Automobile Engineers was changed at the same time to "Society of Automotive Engineers, Inc.," the word "automotive" being coined at that time to indicate the broadened scope of the society's undertakings.

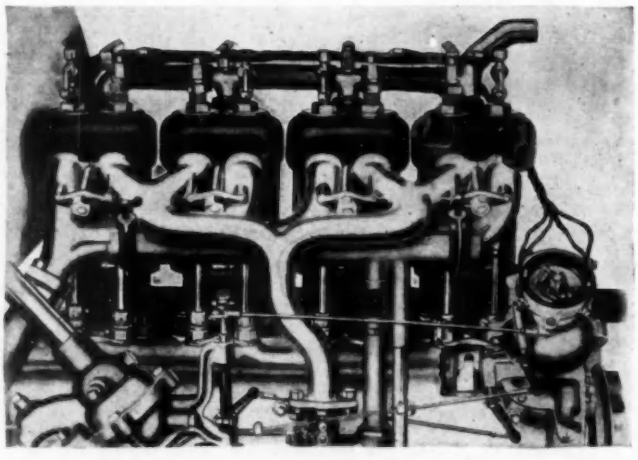
Government recognition of S.A.E. work antedated the entry of this country into the World War, with the result that Society members had been called upon to assist army and navy engineers in the design and standardization of various automotive apparatus. This was, in part, the result of Mr. Coffin's activities as Chairman of Council of National Defense. It was quite largely through his efforts that the Society was so promptly and prominently injected into the war-time activities of the Government, once war was declared.

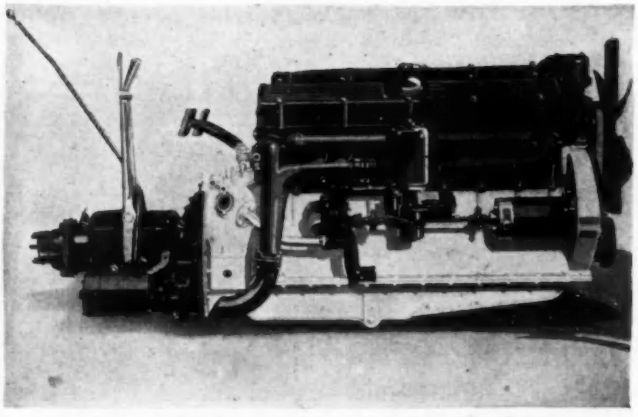
No less than ten members who before or since the war have served the society as president took a prominent part in S.A.E. war work, and several hundred other members performed similar or related types of engineering service, including the design of the Liberty aircraft engine, of the Liberty war truck, of numerous tanks and other ordinance equipment, of many aircraft, and of much other automotive apparatus. About the time war was declared the society established a Washington office which made a business of helping the Government secure the best qualified men for its extensive automotive engineering activities.

CHARLES F. Kettering, now vice-president of the General Motors Corporation and widely known for his research and other engineering work, was president of the Society during 1918, and was succeeded in 1919 and 1920 by Col. J. G. Vincent and Charles F. Manly, both of whom gained prominence in aircraft work in which the society participated during the war.

Since the war the society has continued numerous contacts made with various government bureaus during the war and, through the Bureau of Standards and other government agencies, has conducted important research work. For this work the S.A.E. now maintains a research department which serves as a clearing house for automotive engineering information, and under the direction of a Research Committee, arranges for and follows through various research programs. This work is growing in its importance to the memberhsip and to the automotive industry.

Despite the truly automotive character of the Society, the relative size and commercial importance of the passenger car industry naturally led to considerable emphasis being placed upon the passenger car engineering phase of society work. To guard against neglect of minorities, the





Model G four-cylinder Cadillac engine of about 1907 and the latest sixteen-cylinder model of the same make

constitution was altered when the society took its present automotive name to provide representation among the officers for aircraft, tractor, marine engineering and others of the smaller automotive groups, and various meetings' sessions have been devoted to these groups for many years past.

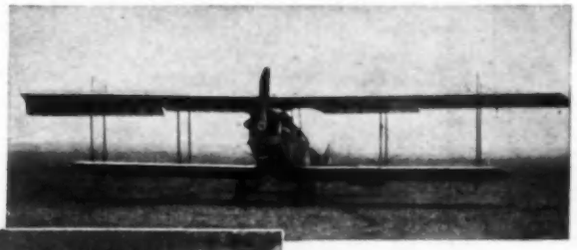
A further move along similar lines resulted about two years ago in a division of the society into several "professional activities," each of which elects its own vice-president and holds "national," as distinct from sectional, meetings as frequently as desired, and also conducts its own sessions at annual and summer society meetings.

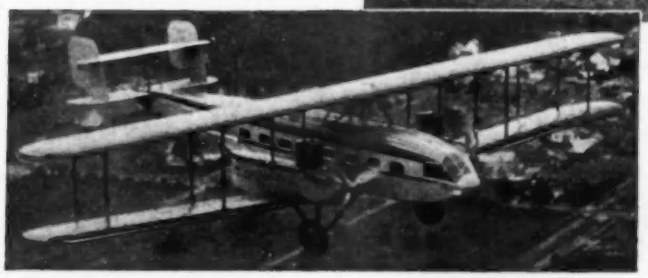
AT the present time these "activities" are eight in number and include: passenger car engineering, passenger car body engineering, aircraft engineering, aircraft-engine engineering, motor truck and motor coach engineering, transportation and maintenance engineering, Diesel-engine engineering, and production engineering. In addition to its vice-president, each activity is represented in the society by a large committee bearing its name and having a chairman and vice-chairman who take a prominent part in seeing that their activity does its share in society work. Just how this decentralization of S.A.E. work will affect the society as a whole is somewhat problematical, but thus far it has resulted in many more meetings of certain groups than were held a few years ago.

Standardization work of the society is not segregated according to professional activities although some divisions of the committee bear similar names, and all activities are represented more or less directly. Since the inception of the Standards Committee the policy of the society has been to see that the personnel of each of its divisions is representative of all classes of interest involved. Thus, for example, if a material or part is to be standardized, both the manufacturer and the user of the material or part are represented on the committee, and where conflicting interests exist, all parties involved are given an opportunity to present their views if not actually represented on the division. All division members are members also of the Standards Committee which sits at least twice a year and passes upon the reports of divisions before they are submitted to the Society membership.

Today the standards and recommended practices of the society comprise over 600 specifications. Design standards are not adopted unless they tend to promote interchangeability, to eliminate unnecessary variety, to facilitate production or servicing, or to advance uniformity in testing, nomenclature, or operating needs.

Since 1926 the society has undertaken to formulate production standards relating to machine tools, to production methods, and to practices in the manufacture of automotive products. Present production standards include such items as T-slots, cutters, taps, and gages.





Curtiss J N airplane, of about the date when the American Society of Aeronautic Engineers was merged with the S.A.E., and today's Curtiss Condor eighteen-passenger transport plane

Latest model Holt Caterpillar tractor and a pre-war predecessor of the same make

Among the oldest and most widely used S.A.E. standards are those relating to steel and to nonferrous metals. These standards, some of which were strenuously opposed by steel manufacturers twenty years ago, are used today almost universally by producers, vendors, and purchasers of metal in this country, and to an increasing extent in Europe and other parts of the world. Another widely used standard is the S.A.E. screw thread, later adopted as a national fine thread standard by the National Screw Thread Commission, upon which the society is represented and which it was instrumental in creating during the World War.

At the present time S.A.E. standards and recommended practices fill a handbook of over 600 pages. They are revised and added to as occasion requires. They relate to all types of automotive parts and materials, but in some instances are confined to such divisions as aeronautic, marine and passenger chassis and body.

One merit of the S.A.E. standards work is its responsiveness to the needs of the industries the society serves.

It seldom requires more than a year or two to create a standard when the need for one arises. Although some S.A.E. standards have proved short-lived or have required early revision, even these have helped to check the great loss which would have resulted if no standard had existed and each manufacturer concerned had produced the diversity of non-essential variations which occur automatically when no standard exists, and that prevent the interchangeability readily obtained when there is a standard for guidance.

Taken as a whole, the S.A.E. standards work is one of the outstanding accomplishments of American engineering societies, and a notable example of what can be accomplished when such a society works in close accord with industry. Partly through its work in standardization the Society has received official recognition as the

A motor "cruiser" of some years ago, prototype of the modern express cruiser

A modern Consolidated express cruiser, showing automotive marine development

body to which such organizations as the National Automobile Chamber of Commerce, the Aeronautical Chamber of Commerce of America, and the National Association of Engine and Boat Manufacturers look in engineering matters.

Somewhat less tangible than its standards work, but probably of no less importance to industry is the interchange of engineering information brought about through the society's meetings and by the published reports thereof. As a general rule, this interchange has been surprisingly frank and free, considering the competition between companies and their usual reticence in divulging new information.

S.A.E. papers take rank with those of any of the older engineering societies and are widely read both in this country as well as in Europe. In consequence, the S.A.E. has gained the position it deserves as one of the great American engineering societies. Its members well may feel proud that it has attained this position in so short a time as 25 years.

· BOOK · REVIEWS ·

"MECHANICAL WORLD" YEAR BOOK FOR 1930. *Three hundred forty-eight pages, 4x6 in. illustrated. Bound in cloth boards. Published by the "Mechanical World." 65 King Street, London, England. Price $0.36 net.*

THIS handbook is intended to be an up-to-date source of reference for engineers and mechanics. The preface states that the sections on Steam Engines, Turbines, Condensers, and Rope Drive have been carefully revised and rewritten. The latest steam tables have been added, and a general rearrangement of the contents is evident.

The book contains much material that is usually found in engineering handbooks, beside other useful material. At the end of the book is a diary for the year 1930.

MATERIALS HANDLING EQUIPMENT. *By Edward J. Tournier, estimating engineer, Robbins Conveying Belt Company. Three hundred and seventy-one 6x9-in. pages; 146 figures. Published by the McGraw-Hill Book Company, 370 Seventh Ave., New York. Price $4.*

WHEN confronted with the selection of suitable equipment for a material-handling operation, the engineer not specializing in such work is up against a knotty problem. It is quite simple to calculate the economy of such an installation, but experience is the only teacher as to which particular type will prove the best in service. For such a person, this book can be of decided value, since it is a complete survey of the use of mechanical handling devices in industry. In showing the advantages of the several forms of conveying machinery for various industrial purposes, it provides a useful guide to economy and efficiency in the selection of such equipment. Twenty-one chapters touch on the history, principles, classification, and handling of bulk materials, on pneumatic conveying, and on mechanical handling equipment.

S.A.E. HANDBOOK, *1930 Edition, 642 pages, 4¼x7¼-in. flexible covers. Indexed. Published by the Society of Automotive Engineers, Inc., 29 West 39th St., New York, N. Y. Price $5.00.*

ABOUT 50 additional pages, comprising chiefly new standards adopted by the Society of Automotive Engineers since the 1929 edition of its handbook was prepared, are contained in the 1930 edition of this useful volume. Although the standards are primarily automotive in character, they deal with many materials and parts used extensively in other industries. A few of the standards relate to production items, such as taps, cutters, gages, grinding wheels, and drills, but the majority are classified under the following headings: aeronautic, power plant (automotive), transmission, electrical, parts, screw threads, tires and wheels, chassis and body, marine, steels and materials, nomenclature, and miscellaneous. The book will prove useful in practically any mechanical engineering, drafting, specification, or purchasing department where up-to-date information on standards is needed.

THE FUTURE

By PHILIP E. BLISS
President, The Warner & Swasey Co.

On May 5, 1930, the Warner and Swasey Company completed its first fifty years of engineering and manufacturing progress. In a commemorative book, shortly to be released for limited distribution, will appear this short article by Mr. Bliss, who has consented that it be preprinted in full herewith

IN THE FIFTY YEARS just completed, Worcester Reed Warner and Ambrose Swasey, and those associated with them, have developed and brought to successful fruition many interesting and wonderful things in engineering and manufacturing.

Not so fully revealed are certain other accomplishments of these men which are of equal, and in some respects, of greater significance. Too often, in this so-called material age, success in business is gaged by the volume of orders received and the figures on the balance sheet. These are highly important, for if a business is to grow and prosper, the need of an adequate financial return must not be underestimated.

It must be conceded, however, that other elements, though somewhat intangible, are prime essentials. Leadership, and the organization which it directs and inspires, must embody staunchness of character and high ideals, without which enduring success cannot be secured. Throughout the entire history of this organization its leaders have never been content with excellent performance without its corollary of idealism. The world-wide reputation of the Company, its founders, and their product, is a testimonial to the attainment of those aspirations.

The life of the Company has extended over a period of increasing mechanization in industry. Some students of affairs believe the major possibilities of this epoch have been largely exhausted. Probably we are just at the beginning of a marvelous era of advance in the mechanical arts, the benefits of which will be far beyond the scope of our imaginations. In all those activities of life which serve the people at large, improved devices offer opportunities to provide not only better things, but at costs which make them available to an ever-widening circle of users.

If this organization as now constituted, trained by the leadership of the past, has absorbed some proper measure of the idealism and high standards of conduct which have gone before, then it may be expected to cope successfully with the problems of the future. It only remains, therefore, for us to discover what opportunities lie before us, and whether they are of a nature that we may reasonably expect to share in them.

Astronomical instruments and machine tools have constituted the products of this Company. While the building of machine tools has represented its larger activity, the Company from almost its beginning has played an important part in the design and construction of instruments of precision. Because of its established reputation, during the past year it has been called upon to provide the preliminary design for the 200-inch telescope projected for the Pacific coast.

Building machine tools seems rather a prosaic business, but the story of the machine-tool industry is the romance of the industrial revolution in America. Our contribution to the industry is in the fundamental field of turning-machines. It would seem, from a survey of the prospective needs of this highly mechanized age, that the future will hold a larger opportunity than the past. In the past year the demands on our Company for metal-working machinery were greater than in any similar period of its history.

We believe that this Company, in the process of recruiting and training young men, will bring into its service energy and inventive genius sufficient to continue it in its place of recognized leadership, maintaining the fine spirit of fellowship and co-operation, with the conscious effort toward high performance which now permeates the entire organization.

There is a Spanish proverb which says: "He who would bring home the wealth of the Indies must carry the wealth of the Indies with him." The past of The Warner & Swasey Company has been a glorious one. We of the present generation have inherited a wealth of character, reputation, and good will; we can go forward with assurance that if this precious inheritance is well used we can take from the future an abundant share of its success and prosperity.

EXECUTIVE · FORUM

Should Small Shops Co-operate?

TED HOLDEN was poring over a set of books when Bill Holland entered his office. Although Holland counted among his friends the executives of many large industrial plants, he found time to keep in touch with the proprietors of several small shops. The peculiar problems of the one-man concern and its struggle for existence in an era of big business interested him. Holden, who ran a small tool and die shop in one of the large manufacturing buildings, was an old friend.

"Taking up accounting, Ted?" inquired Holland by way of greeting.

"I have to whether I like it or not," Holden answered with a grin. "A few years ago I struck a balance by looking in the cash drawer. Now the government makes me keep books—even if it didn't, the big fellows crowd me so close, I have to know exactly how I stand."

"Well, I'm glad you're philosophical about it," commented Holland. "Most mechanics would rather work to half a thousandth than work on a set of books."

"I don't claim to enjoy adding these figures," responded Holden. "Collections are another nuisance. The two of them take a lot of my time from the shop—sometimes I feel that I am losing that personal touch."

"Why not hire someone for the work?" suggested Bill.

"We small fry only get by because of low overhead," Holden explained. "A poor bookkeeper is worse than none; an ordinary bill collector loses more accounts than he is worth. And a good man wants more money than I can afford to pay."

"As near as I can make out Harry Duncan and Joe Dickson in this building are in the same boat. Wouldn't it pay to get together with them on the clerical end of the business? A little co-operation might answer the question for all of you. To tell the truth, I don't think any one of you is a real accountant."

"I don't deny that," Holden agreed, "but your suggestion has its drawbacks. Harry and Joe don't specialize in exactly the same line as I, but there are many jobs on which we all bid. I don't think that would go so well in the same office. Did you ever hear of a scheme like that being worked successfully?"

"As far as bookkeeping goes—yes," assented Holland. "A real office manager with a clerk and stenographer might be the real solution. As to estimates, you would each make your own as before."

"In one office it would be hard to keep quotations confidential," objected Holden. "If I took a job away from Joe, he would naturally be peeved. Actually it wouldn't be any worse than now, but seeing each other in the same office would not help matters any. It's hard to co-operate and compete at the same time."

"Well you can have the suggestion for what it's worth," said Holland. "One thing sure is that it will never work if you let minor personal differences stand in the way. From your argument, I've a suspicion that you've developed a liking for bookkeeping and bill collecting anyway."

What Do You Think About This Executive Problem?

In his anxiety to keep down expense, the small shop proprietor frequently loads himself with a mass of detail. Can this burden be relieved by pooling the clerical work of several small companies, or should each solve its problems independently?

You may have had experience in the difficulties of small industrial units. A letter to *American Machinist* expressing your views on this subject would interest other readers. Contributions accepted will be paid for.

DISCUSSION

OF PREVIOUS PROBLEMS

Should Overhead Be Uniform?

The writer was at one time connected with a large manufacturing concern that went bankrupt, principally because the sales department, in order to keep a large number of steam hammers going, accepted work at the rate of $2.00 per hour for these hammers. Due to erroneous distribution of overhead, the steam cost was spread over the machine, pattern, and other shops, and not localized on the forge shop where it was used. We should have gotten $10 an hour from those hammers.

That example illustrates the care necessary in order to distribute burden properly. A machine shop or plant with medium-sized equipment may successfully distribute burden on a flat hourly rate. A plant with large expensive machines, such as steam hammers, planers, or large millers, has to be extremely careful in seeing that these machines carry their share of the burden. You can't charge the same overhead on an hour's work from a 10 ton steam hammer that you can on an hour's work from a sixteen-inch lathe.

—James K. Matter, *Supervisor Press Shop, E. G. Budd Manufacturing Company.*

What Price Titles?

When a man is given a title, he is automatically lifted into a higher class of society. When he enters that class, he must adopt a higher standard of living, which means higher living expenses. Needless to state, a high-sounding title does not keep the wolf from the door.

In the eyes of a competitive employer, a title implies a certain degree of ability which he may be in a position to use. Should the competing employer feel inclined to make an offer, the man with the title may be sorely tempted to accept a position, which may not carry a title, but does carry a salary in proportion to the ability required. Accordingly, the stability of the executive staff of the employer depends upon the value placed upon titles. I believe that an executive staff built upon such a foundation will be found lacking in loyalty when the test comes.

—R. H. Kasper, *Steel Heddle Company.*

In every company, there are a few men who are paid with high sounding titles instead of high salaries. And many people are impressed or satisfied by this kind of thing. Of course, there is a certain amount of prestige in an important-sounding title. At the same time, it is good economy to use a title as a substitute for money, if the victim is willing.

As a rule, the men who are entirely satisfied by the reward of an empty, high-sounding title are not the class of men who make themselves indispensable. Such an award is a spur to them. It urges them on an endeavor to prove that no mistake was made in conferring the title on them. But when they discover that no increase in salary and privilege is forthcoming, after a lapse of time, they are prone to let up in their efforts and drift with the current.

—L. O. Brown, *Toolroom Foreman, Holcomb and Hoke Manufacturing Company.*

It is all very well to give a man a title, but a new title, without at least a moderate raise, leaves a bad taste in one's mouth. A man may be promoted to a more responsible position and be given to understand that the salary will be the same until he breaks in on the new job, but a title without change of duties is too obviously a sugar-coated pill. Unless a definite promise of a raise at a definite time, if not possible at once, goes with the title, it is but a confession of a guilty conscience on the part of the employer.

—J. C. Bode.

High titles will not long take the place of high salaries for first class men. They have too keen an appreciation of realities to be satisfied with titles as substitutes for salaries. However they may (and probably will) use the title promptly to get the cash from another employer.

For some men high titles are dangerous. They go to the head causing a swelling thereof that results in waste. These men are the only ones with sufficient vanity to be satisfied with a high title as a substitute for cash. Therefore, those who pay with high titles receive for them what they are worth—nothing, or a minus quantity.

Titles and salaries should be appropriate to the work. The company that offers high titles in place of salary is on the same low level as the individual who tenders flattery in return for service.

—J. J. Woffington, *Leamington Spa., England.*

Should Price or Payroll Be Cut?

My experience has been that the management must at times take a licking on some jobs just for the purpose of holding key workmen during slight lulls of business. The best proof of the cost of instruction and learning I have seen came when we expanded the force some months after having our schedule materially reduced by the Board. In building up for production again, I had the accounting department charge not only time of instructors and learners, but also spoiled work, and any charges necessary to reprocess damaged work caused by this instruction. The actual figures made the rule-of-thumb cost of "making an operator" increase from the accepted $150 to over $750. This latter figure was obtained after weeding out the apparently inefficient learners without any delay.

Until the factory and the accounting department secure data such as outlined above, it is merely a matter of guesswork for the president

to try to decide on an issue as stated in the Mid-City Machine Works problem. When the factory and accounting department have this data, they can go to the president with facts and show true costs of either taking business at a reduced burden rate or of reducing the factory force.

—E. E. GAGNON.

Should Estimates Be Given Operatives?

Any change in manufacturing methods usually results in a change in the cost of production. Wherever a shop is doing special work on unstandardized equipment of widely varying capacities, it is highly important that the estimator outline the method of production upon which he based his estimate. This outline should be placed in the hands of those who are responsible for the actual routing of the work through the shops.

In a shop operating on a day-work basis, I do not believe it good practice to advise the operatives of the exact time allowance. They are likely to take the allowance too literally and make no effort to better it, even though they would normally turn out the job in less time. If there is an incentive wage payment plan in effect, the above is not true, as it is to the operatives' advantage to better the allowed time and thereby earn a bonus. In the latter case, the operatives should be given a complete detailed operation analysis of the job together with the allowed time for performing the work in a satisfactory manner.

—W. B. LINCOLN, *Chief Engineer, W. J. Savage Company.*

Upsetting Production Schedules

Let each department foreman select one man to perform all special work when such work is in his department. At other times, when there is no special work, let this man work on lot jobs that are not needed at once. In that way, it will not really stop production if the man must return to special work. The man doing special work will become efficient in special set-ups and will perform such work better and more quickly.

—ALBERT H. BARTH.

Should a Plant Take an Annual Inventory?

The annual inventory in our company can never yield a correct result because it is done in a hurry. Our men lose no wages. All available men in the designing department become members of inventory groups, but the shop executives remain in their working places because our shops are not shut. We get only approximate values by annual inventories, and that is the reason why I have always been in opposition to this practice. I cannot see any advantage in annual inventories.

—FRANZ BERMAN, *Engineer, Vienna, Austria.*

Sales or Sincerity?

If the sales manager, after strenuous effort, has finally opened negotiations with a big customer, he should get the full and hearty support of every department of the company, even if the first order is on a no-profit basis. The sales manager, through his experience, is in a position to judge when to promise delivery of an order to a customer, and he should have the liberty to advance a date over the regular production ability of the company in order to obtain new business. In the long run, it would pay the company to put the shop on overtime for a particular job in order to meet the date.

—MORTON SCHWAM, *Design Draftsman, Naval Aircraft Factory.*

How far should a sales manager allow his enthusiasm to carry him in his effort to secure orders? No further than his judgment, which should be good, tells him that a thing can be done and done right. Of course, occasionally it becomes necessary to speed up a delivery promise a little, but this should not be done without letting the production head in on it in advance for his opinion, as it is much better to lose an order than to lose the customer's confidence.

—CHARLES R. WHITEHOUSE, *Chief-Time Study, The Holtzer-Cabot Electric Co.*

No ambiguity should exist regarding the sincerity of all the clauses in a contact. The ethics governing delivery should be as strict as those defining workmanship and material; faults in any one of these reflect adversely on the others. A salesman should only offer what he is assured the factory can supply.

Strict reliability is an incalculable asset built on sales and sincerity, and forbids their separation in the least degree.

—JAMES G. TURTON, *Heald Machine Company.*

Who Should Do the Firing?

When conditions have reached the point of terminating a man's employment by firing him, it is best done by his foreman. Firing usually occurs when the last bit of patience is exhausted. Decision under such conditions should be prompt and decisive and should permanently keep this man out of that department.

The question of rehiring such men for other work can be handled by the employment manager. He should, however, be well acquainted with the conditions and reasons for discharge, and inform the new foreman in advance of these conditions. Rehiring should not be done immediately, as it breaks down shop discipline. A superintendent should have faith in his foremen in such matters. He can listen to discharged workmen's stories but he should never make a definite promise without consulting the foreman involved.

—L. F. SWENSON, *Industrial Engineer, Perkins Machine & Gear Co.*

Factors Affecting Machinability of Malleable Cast Iron

By H. A. Schwartz

Manager of Research,
National Malleable & Steel Castings Company

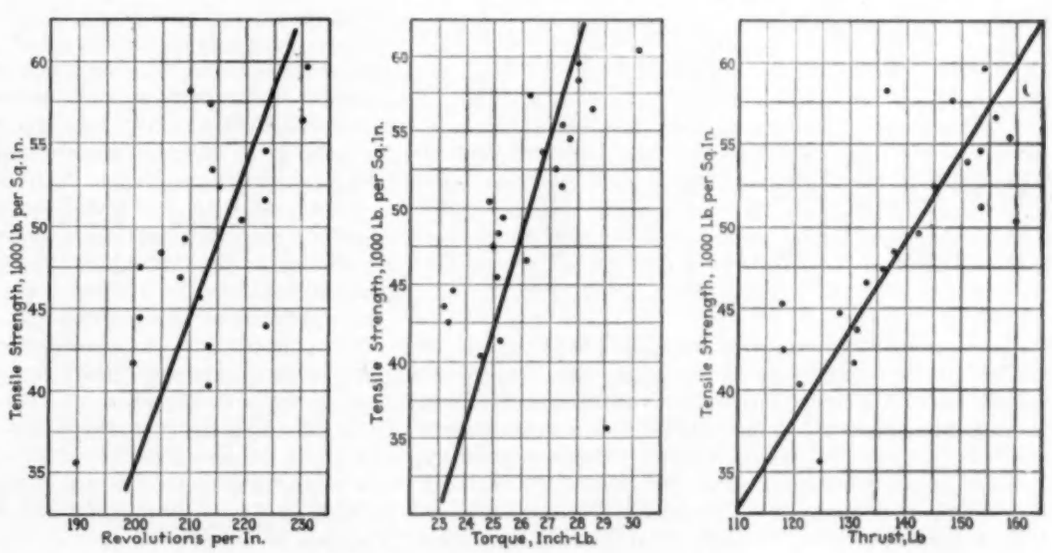
THERE is probably little doubt that malleable cast iron, when properly made within the limits of reasonably good commercial practice, is the most readily machinable commercial ferrous metal. Considerable difference of opinion now exists, however, concerning the comparative machinability of high-carbon and low-carbon malleable cast iron. The problem is rather serious, for (since tensile strength, shock resistance, and similar properties are determined primarily from carbon content —the lower carbon being the more desirable) if high-carbon material does machine the more readily, then there is an incompatibility between high strength and ductility on the one hand and machinability on the other. Such an incompatibility, if existent, must be reckoned with when writing specifications.

The protagonist of the point of view that high carbon favors machinability, reasons that carbon is the most important factor in determining any of the physical properties of malleable, and since machinability is but the expression of a complex of other physical properties such as strength or hardness, machinability must be also determined by carbon content. He reasons further that if it be so determined, then the effect of carbon on the other variables is in such a direction that the ease of machining is improved with rising carbon content.

The opposing side, even though granting the truth of these contentions, offers in rebuttal that machining is confined generally to a thin surface layer, and further that the composition of this layer is determined by the conditions of annealing, and not by the original composition of the iron. Hence, the composition of the original hard iron cannot be the determining cause of the machinability ultimately observed.

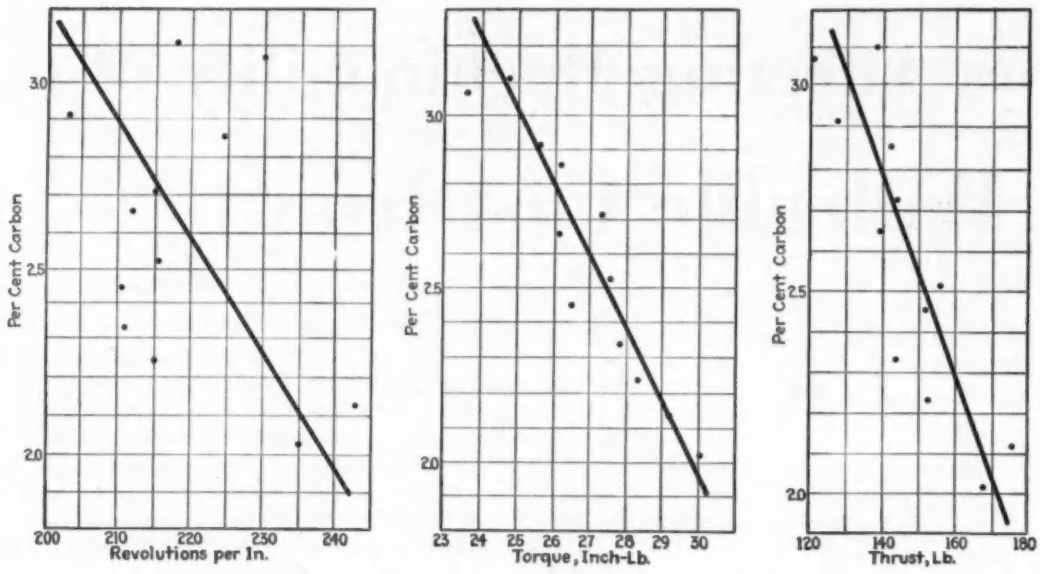
Lacking an authoritative statement of preference by a user who has studied the matter, perhaps we may be guided by current practice in determining what is customarily used by those who would machine the product readily. It appears that some users consider the high carbon as beneficial, and that there remains some doubt as to whether the increase in carbon produces a visible improvement. No one asserts that high carbon reduces machinability. All this may be abbreviated still further in the statement that certainly high-carbon is at least as machinable as any malleable and perhaps even more so than low-carbon. Were it not for the possible desirability of using low-carbon metal for considerations of strength, the discussion might be well considered closed by these conclusions. However, since the lower carbon may be legitimately desired for other reasons it becomes necessary to consider the question, "Does low-carbon iron machine with greater difficulty than high-carbon iron, and, if so, to what extent?"

The drills in this series of tests were run in each case at 240 r.p.m., which is a rate approximately correct for drills of carbon steel of ½-in. diameter. For feed under constant load, a gravity pressure of 220 lb. was applied. The power feed was at the rate of 0.005 in. per revolution. The drills, being of high-speed steel, were found not to be dulled during the progress of the experiment, as evidenced by the constancy of result obtained by drilling from time to time a standard material with the drills being used for the investigation. All efforts were made to minimize errors due to the character of the drill used or to its wear, and in order that the results might be affected as little as possible by an unforeseen



Three criteria of machinability plotted against the average values of tensile strength. The lines shown represent the most probable relationships

An abstract of a paper presented at the annual meeting of the American Foundrymen's Association in Cleveland, May 12-16, 1930.



Total carbon before anneal is the basis for this plotting of the same three criteria of machinability. The carbon in a given group is constant within 0.10 per cent

characteristic of works practice at any one plant, the metal for this investigation was obtained from 14 malleable plants representing a wide distribution of foundries. Further, the chemical composition before anneal and the strength and elongation of each specimen were determined and reported to us by the plant furnishing the material. Shore and Brinell hardness were determined in our laboratory. The drillings from each hole were collected separately and analyzed for total carbon.

Metal submitted purposely varied greatly in quality, including some very-high-carbon iron made as stove iron, as well as some of the best available material. The range in carbon was practically from 2 per cent to 3.10 per cent before annealing, the strength varying from a little over 35,000 lbs. to about 60,000 lbs. per square inch. About 125 heats were represented in the investigation.

Table 1 shows the effect of carbon on the resistance to threading. As indicated by this table the effect of an increase of 1 per cent in carbon is to reduce the torque a little less than 63 in.-lbs. for hot annealed, presumably more decarburized metal, or a little under

Table I

EFFECT OF CARBON ON RESISTANCE TO THREADING

Si	Mn	S	C	Torque on ¾ in. Pipe Die, inch-lbs. Hot Annealed	Cold Annealed
0.91	0.30	0.076	2.58	319	330
0.89	0.30	0.078	2.71	319	326
0.90	0.31	0.080	2.79	303	330
0.95	0.30	0.091	2.85	313	334
0.90	0.28	0.070	2.96	294	329

20 in.-lbs. for cold-annealed metal. These results are not offered as conclusive, but, in so far as they are worth anything, they are experimental evidence that surface machinability is not independent of the properties of the material as a whole. Maximum cutting speeds, under test conditions are shown in Table 2. The depth of cut was in each case 3/32-in. and the feed, 1/42-in. per revolution. It will be noted that the cutting

Table II

MAXIMUM CUTTING SPEEDS UNDER TEST CONDITIONS

	R. P. M.					
Location	13.0	17.6	23.4	31.2	42.0	Mean
Surface	54.5	55.3	63.7	62.8	60.6	59.4
Heart	.....	83.4	80.6	79.7	79.8	80.9
Surface	.....	.....	73.7	74.6	63.6	70.5
Heart	.....	76.8	94.3	82.7	80.7	83.8
Surface	64.7	68.25	66.7	61.4	66.0	65.4
Heart	.....	98.0	.....	92.0	92.0	94.0
Surface	50.25	53.0	53.6	57.15	63.25	55.45
Heart	.....	90.0	91.25	92.0	90.75	91.0
Average	56.5	75.0	74.8	75.3	74.6	.....

speeds to produce failure are all low because of the purposeful selection of a tool which would not stand high speed. The speeds, therefore, are not comparable with shop practice using tools of other materials.

The following conclusions were reached as a result of these investigations: There is not a sufficient body of data so far available to justify any very sweeping conclusions. It is obvious that, in general, the tool load decreases as the tool goes further and further into the casting, the decrease being at first rapid and then rather slow. Judging by the mean of the three inner layers, the differences in annealing condition have caused much smaller differences in machinability than the differences in initial carbon. Although the loads observed on turning the inner parts of the specimens vary somewhat with the annealing conditions, there is a general conformity to the rule that, for metal more than $\frac{1}{16}$ in. from the surface, the machinability is largely independent of depth and mainly determined by carbon content. The irregularities of results are believed to be due largely, perhaps entirely, to the presence of shrinks in the unfed specimens used in the investigation. In the outer $\frac{1}{32}$ in. of the castings, the results are so erratic as to permit no general conclusions as yet. Observations are recorded showing that there are even well-marked exceptions to the expected relations that the outer skin is more difficult to machine than the heart and that the difficulty of machining surface metal increases with its degree of oxidation.

The data revealed by the tests leave no room for doubt in the writer's mind that, as measured by drill testing, the machinability of malleable iron is very largely determined by carbon content, as are its other physical properties. The turning tests reported at least are fairly well in line with this conclusion, so long as the amount of metal is not too small, but are not in themselves voluminous. The threading tests cannot be given too much weight. It is believed that future investigations of surface machining operations removing considerable thicknesses of metal will not be productive of much new information, but that tests which remove layers of the order of magnitude of a few hundredths of an inch may be very instructive. The commercial applicability of such tests will depend upon whether or not the production operations remove layers of similar thickness. Investigation on the machinability of surface layers, to be of value, must be conducted with very unusual precautions to insure cleanliness of surface, uniformity of thickness of cut and accuracy of measurement of tool loads, which are, at best, small.

This paper was written primarily as a means of promoting discussion of the question as to whether there is any incompatibility between high strength and easy machining of malleable among those with actual knowledge of the subject. It is recognized that drill tests are not necessarily equivalent to tests which remove surface metal only. Turning tests are described in the paper which tend to corroborate the findings of the drilling tests with the limitation that the cut be not too thin. The data available seem to show that the machinability of thin surface layers does not conform to any simple assumption, and should be separately investigated before conclusions are possible.

Trends in Buying Stimulate Standardization

By I. J. FAIRCHILD
Chief, Division of Trade Standards

THE past decade has witnessed a decided trend on the part of professional purchasing agents towards the use of specifications as a basis for buying, until at the present time, professional purchasers quite generally are committed to the policy of purchasing on specifications. As witness to this fact, the National Directory of Commodity Specifications lists more than 27,000 specifications, among which are evident considerable overlapping and conflict. There is apparent, also, a decided tendency on the part of buyers to inquire more deeply into the relative merits of competing commodities and to demand that purchased goods shall present at least a certain service value.

Many industries have recognized the trend towards increased diversity of specifications and towards a demand on the part of the consumer for assurance of quality. These groups are stepping out in front of the specification procession by taking the initiative in the establishment of commercial standards, standards which entire industries recommend as a basis for purchase.

These industries are pooling their intimate knowledge and experience concerning the goods which they produce and are recommending rational specifications which search out the most important criteria of quality. It is evident that a specification, drafted by manufacturing experts honestly endeavoring to give consumers the benefit of their knowledge, and adjusted to meet the comments and suggestions of distributors and consumers, is almost sure to be of a character to demand respect, warrant its adoption, and restore the general character of the industry to a higher level.

"Good Will" is recognized every where as a most important business asset. A constantly increasing number of industries, recognizing the new competition in which whole industries vie with one another for a share of the consumer's dollar, are building foundations for greater good will for themselves as a group by the establishment of commercial standards. This procedure is one of the most efficacious methods of setting up uniform bases for fair dealing and assuring the consumer of satisfactory quality.

The function of the National Bureau of Standards in such work, after receiving a request for standardization, is four-fold: First, to act as a referee to secure adequate consideration of the needs of all interests; second, to supply such assistance and advice in the development of the program as past experience with similar programs may suggest; third, to solicit and record the extent of adoption and adherence to the standard; and, fourth, to add all possible prestige to the standard by publication and promulgation after it is adopted and accepted by all elements directly concerned.

The service leading to the establishment of commercial standards is available upon request to any industry which feels the need of improvement. There are no fees connected with it, the only requirement being that an industry shall indicate voluntarily its willingness to co-operate. No claim is made that commercial standards are applicable to all industries or to all commodities, but it is hoped that this service will be given consideration in connection with the present problems of many industries and that those who feel the need will not hesitate to request the co-operation of the National Bureau of Standards in the establishment of commercial standards.

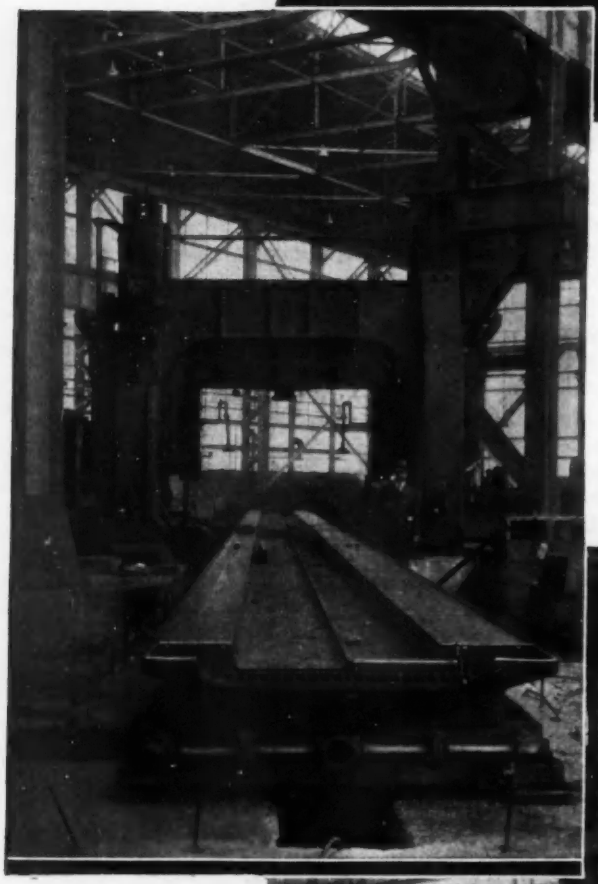
Abstract of an article appearing in the Commercial Standards Monthly, an official publication of the U. S. Bureau of Standards.

An X-ray testing procedure for welded pieces has been developed for use in estimating quantitatively the strength of the welds at defective points indicated by a stethoscope test. The X-ray test can be applied independently, but the location of defective spots can be determined more rapidly with the stethoscope, so that a combination of the two tests provides a satisfactory quantitative, non-destructive, method of testing welds.

Eddystone Approaches Completion

Being in the nature of a progress report on the newest plant of General Steel Castings Corporation, Eddystone, Pa.

The machine shop as seen from the Delaware River. An opening has been left for the transfer building from the foundry



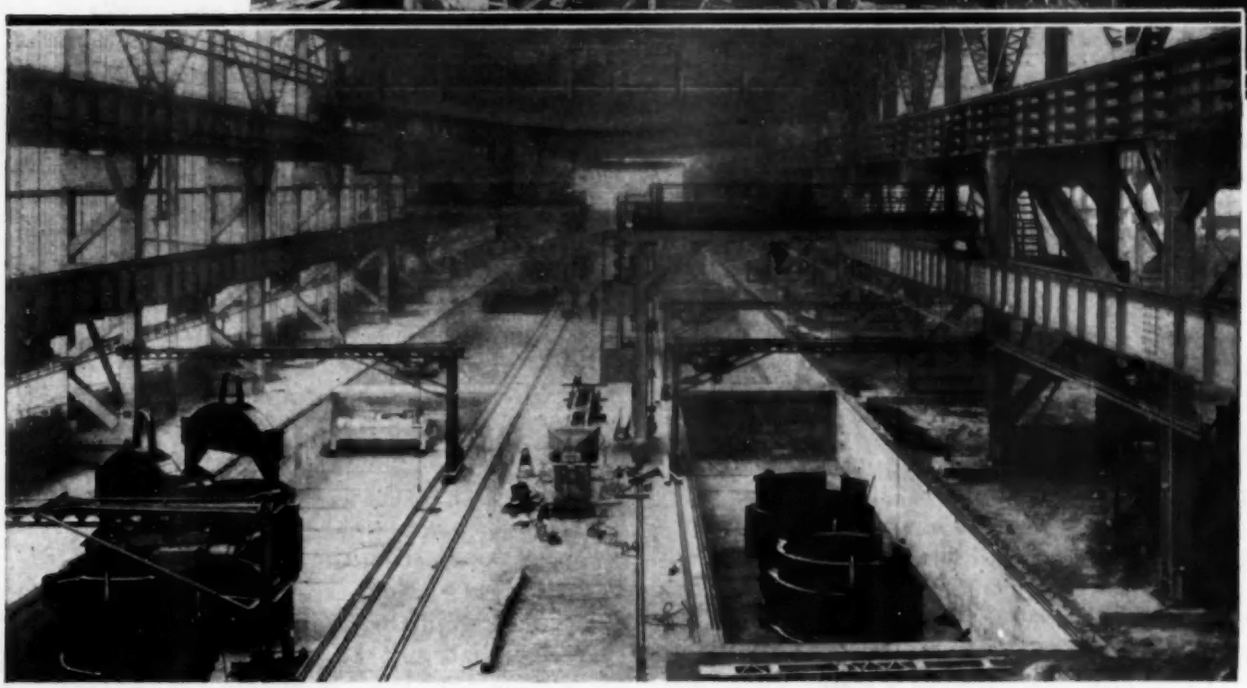
FOURTEEN acres of windows, 85 tons of putty to set the glass. Though they have nothing directly to do with the mechanical operation of the plant these figures may give a clearer impression of the size of the project than others more direct in their application. The Eddystone Plant of General Steel Castings Corporation is now entering the final construction stages and should be in full production by midsummer, if not before. Subsequent articles will describe operations and underlying plans.

As evidenced by an airplane view published in *American Machinist* (Vol. 72, p. 678f) the 239-acre plant site shows wise selection.

Looking down 120 ft. of planer way. This huge tool has been designed for locomotive frames

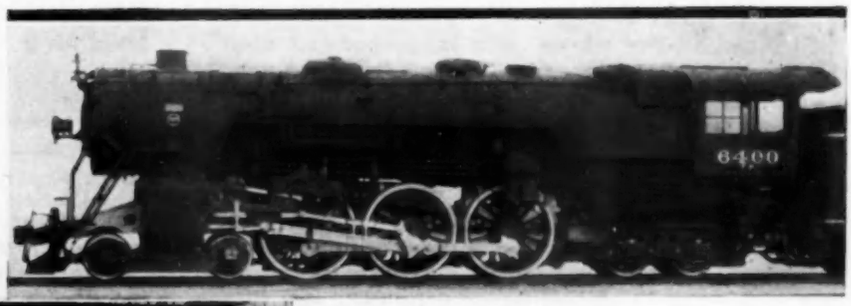
In April, the machine shop was still in the throes of tool erection and underfloor work

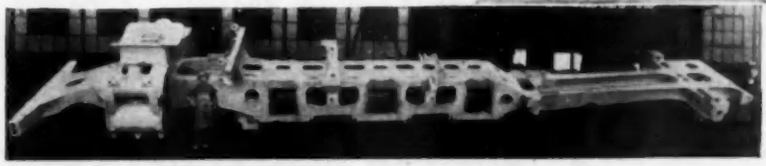
Looking through the upper windows of the machine shop toward the 270-ft. x 1170-ft. foundry. Work on the transfer building is seen in the foreground



The pouring pits of the foundry served by one-legged gantries and overhead cranes. Here will be set the cores for the gigantic castings for which the whole project has been conceived and erected

THE plant itself has been planned to produce 60,000 tons of basic open hearth steel castings annually in units of from 20 lb. to 150,000 lb. Both melting and annealing will be by fuel oil. Of eight buildings, the most striking are the foundry and the machine shop, these being connected by a transfer building. The foundry is 270 ft. wide and 1,170 ft. long; the machine shop 192 ft. wide and 990 ft. long. Facilities are being provided to cast, anneal, and machine one-piece locomotive frames with cylinders integral.





A C. M. St. P. & P. locomotive and its one-piece frame. Note its size as compared with the workman in the foreground

The following narrative is a "case" presentation of the topic. It has been written to involve some of the questions that arise in the average shop. For guidance in preparing discussion the questions given at the foot of the page have been arranged

Material Handling

"WHAT did Williams mean when he asked us to look into material handling possibilities in our department, Al? Are we going to install conveyors?"

"I haven't heard anything about a conveyor system, Ed, but there has been considerable talk, I understand, about cutting the cost of material handling. There are means of handling material besides conveyors."

"Well, I can't see why we're not getting along all right as it is, but if Williams feels that he must spend money for equipment, I vote for a conveyor."

"You vote in shop matters like you do in politics—blind. What would you do with a conveyor in your department, for instance?"

"Why, I'd use it to bring in castings and take out the finished work, of course."

"Yes, of course, but where would you bring them from, and where would you convey them to, and suppose you did do it, where would you put your machinery while you were doing the conveying?"

"My gosh, can't I make a statement without you jumping on it. Why can't I use a conveyor? Other people do."

"I'll tell you why in words of one syllable, big boy. A conveyor is a permanent fixture that starts somewhere, travels along a definite route, and ends at some particular spot. Now, if the whole or a large part of your material originated at one place and followed the same route to the same destination, a conveyor would be just what you want; maybe."

"Well, my material don't do any of those things, I'll admit. Some comes from another department, some from the storeroom, and some from the foundry. But I have seen roller conveyors that were not permanent. What's the matter with using those?"

"Nothing, if you have room and your product is such as will roll on them. But much of yours won't."

"My gosh, I don't wonder Williams talks these things over with you, you're so dang helpful. How can he reduce material handling costs unless he has equipment for it?"

"He is going to have equipment, and we can save a lot of money, but it will be by the use of lifting trucks, skids, unit material boxes, and things like that—maybe a tractor to bring things from the foundry."

"All right. Now let me tell you something. If Williams will issue orders that material shall not be delivered from the store-room until the department has ordered it in, and not then unless the lot is complete, and that no department shall bring in castings from storage until they are wanted and the lot is complete, that will do more to cut down handling costs than all your tractors and trucks."

"How about a conveyor from your department out to the scrap heap, Ed?"

How can handling charges be reduced in a contract shop? To what extent does plenty of floor space help production? Is it more economical to decrease the number of machines in order to install handling equipment, or increase machinery equipment at the expense of handling charges?

Contributed by I. L. Kentish-Rankin

Foremen are invited to discuss these questions vital to their work; of course the

DISCUSSION OF EARLIER TOPICS

No Verbal Orders Accepted

"TO ERR is human, to forgive divine." These two statements reflect a beautiful philosophy and involve a law of human nature, but it is a questionable practice to have the errors of a superior official in an organization, operating for profit, excused or protected by a subordinate. The best practice is to avoid the possibility of error on the part of any official. Exact and specific data should be given by the customer to the shop manager and by the shop manager to the foreman. This exact information should consist of a sketch or its equivalent where sizes are specified, and all dimensions should be indicated.

No matter if it is a "thank you" job, this will establish responsibility and save argument, and no one need be protected by a co-worker of any degree.

Where a part is ordered requiring close fitting, it is good practice, in addition to the specific data referred to, to give the workman the part to which it is fitted.

No verbal order should be given to a workman on work requiring care, or indeed a moderate degree of care. The human mind is so constituted that it very quickly forgets transient impressions.

—HOMER A. HERR, *President and General Manager, Automatic Centrifugal Company.*

*

Old Kinks and New Ideas

I HAVE come to the conclusion that most new ideas are old kinks reborn. I have proved this many times by looking through the kinks that I have catalogued. When I look through a trade journal I note each item dealing with dies, also any advertisements bearing on the working of sheet metal. These advertisements I file in stiff-back books under various headings—the kinks and other articles in another book. When I have any time to spare, at work, I often look over these books and thus keep my mind refreshed with what I have filed.

I not only store these ideas and kinks. I make use of them. Once you have tried out a kink you never forget it, but if you try to remember it without either trying or cataloging, then it is lost.

Another method I adopt in keeping ideas before me is this: I use a fairly large desk diary, and I enter anything that is worth while to the firm's product. Thus, on Jan. 20, I entered this: "On page 122, *American Machinist*, is shown a can body forming and soldering machine with an output of 300 can bodies per minute." This was an advertisement, torn out and booked accordingly. At the end of March I was called into the office and the following conversation took place between the managing director, works manager, and myself. "We have sent for you, Smith, to see if we can do anything with this inquiry. We are promised a large contract for air-tight tins. This is a sample. Now, can we make these with our present machines?"

"Certainly, but not at that price. For example, we solder the seam by hand after the body is made by other methods. I will fetch you a book showing how these are made in plants that go in for this thing."

I showed him the advertisement of this machine. He was astounded at the output promised and sent out inquiries. This example gives you an idea that this method of booking advertisements and kinks dealing with your own work is a help all the time, besides giving a certain amount of pleasure when looking over these books during spare moments.

—JOHN SMITH, *Nottinghamshire, England.*

*

Smoking During Working Hours

FEW characteristics are so typically American as the instinct of fair play, and a group of men can be led a long way so long as they are kept sold on the fairness of the proposition.

A no-smoking regulation in any area of an establishment should apply, I believe, equally to everyone who enters that area. Anyone violating the regulation is equally deserving of discipline.

The spirit of fair play dictates an impartial enforcement of regulations, and on the side of logic is the argument, usually true, that the employee in the area under restriction is more justified in smoking, from a fire hazard standpoint than an outsider, as he should be more familiar with the risks involved and with the guards against serious consequences.

The eighteenth amendment enforcement situation is somewhat analogous, and the results are familiar. It is difficult to get observance from the little fellows when they think or know that the big fellows can violate the law and get away with it. Just make the fellow in the shop believe that the big boss abides by the same restrictions and see how quickly he conforms.

—W. A. KIRKPATRICK.

THE recess, or smoking period, has been tried, and still exists in many plants. As a chance for the men to stretch and get their second wind it is O.K., but otherwise I believe it a failure. I have worked under the plan, but who enjoys a smoke when he doesn't want it? Perhaps I wanted one just before the recess period, and when it came I did not feel like smoking. Then came a time an hour or so later when I wanted a smoke. Did I take it? Sure, I did.

Suppose we are foremen in a plant where "No smoking" signs are all over the walls. Everyone of us is doing everything possible to enforce the rule, just as every foreman should. Now, let's meander up to the office. There, all framed and dolled up, we see a special permit which says that smoking is allowed within the

discussion is not limited to foremen. Letters accepted and published will be paid for

walls of the office. That sure is a grand and glorious place. When we feel like having a smoke, don't we go to the office to take up some "matter" with a member of the office force? Sure we do. Then it must be that we are sneaking a smoke too. Perhaps we don't think we are, but nevertheless we are. If the office isn't blessed with such a permit, we go down to the boiler room or blacksmith shop. If not there, then to some other place where we can smoke. As long as the men do not take advantage of a foreman he had better turn blind when a man sneaks a smoke, because they will do it anyway.

—C. MANGER.

IF THE rules prohibit smoking in the shops, then obviously the shopman who breaks those rules must be penalized accordingly, but the same rule should affect all employees regardless of position, and no intelligent visitor would object to having a rule pointed out to him prior to entering the shop.

There always has been a type of labor to whom the "two draws and a swallow" in the washroom are a necessity. To the average workman, however, a smoke interval is not necessary, and where no distinction is made between office and shop, I do not think it is desired. But irritation is caused where there is one set of rules for the shop and another one for the office.

—LEONARD COOMBES, *London, England.*

THE fire rules with which "NO SMOKING" edicts are planned to comply, are no respecters of persons. A fire may start just as readily from the president's cigar as from the apprentice boy's cigarette. Therefore smoking prohibition should be universal and apply equally to all. It may seem small, but to those of us who know the shop, the fundamental principles of democracy are never brought more clearly home to the men than in this matter of smoking. The big bosses may rate their mahogany desks, their rugs on the floor and their paintings on the wall, without envy or dissent, but no shop man will ever admit that they should be permitted to smoke where he is prohibited.

Smoking prohibition should be universal. The shop foreman should graciously call the attention of all violators, whether visitors or office men, to the rule. Experience has shown that if this is done courteously, with a simple explanation, it is always cheerfully complied with. The unusual individual in the office force who feels himself privileged beyond all reason will usually automatically remove himself from the scene if given time, for the same trait represented by his disregard of smoking rules will inevitably get him in wrong in some other respect.

—ELI SMITH, *Engineer, Russell & Company.*

*

Foremen and the Wage Bonus

THE principle behind wage incentive plans is that men must have something to gain if their best efforts are to be constantly put into their work. This idea applies to all employees who are paid, more or less directly, for what they know. If a line is to be drawn, it seems that all those below the grade of superintendent would be eligible for bonus.

The question is, then, how to determine the amount, and what to select as contributing factors. In the first place a standard of excellence for the department as well as for each job must be decided on. The most convenient method is to have all rates set in units of time so that totals can be readily found. The sum of all the time allowed checked against the time taken will give an average efficiency of production. The men, of course, would receive bonuses according to their individual scores.

—L. F. SWENSON, *Industrial Engineer, Perkins Machine & Gear Company.*

*

Keeping Machines on the Job

WHERE I am employed we have an inspection unit composed of a master mechanic, a maintenance man, and two first-class machinists who make a tour of the shop once a week and look the equipment over. Department foremen are required to report any machine that starts to "act up," no matter how trivial the trouble may seem. Though this method sounds rather elaborate, it cuts to practically nothing the idle time on machines. If a machine is not working just right, but a rush of work prevents us from tieing it up, the maintenance men visit it two or three times a day to keep tabs on it until there is a chance to make repairs. A strict rule of the company is that foremen or operators are, under no condition, allowed to repair a machine.

—CHARLES R. WHITEHOUSE, *Chief Timer, Holtzer-Cabot Electric Company.*

*

The Spring Song

THE old adage, "Everything comes to him who waits," may be true enough, but the man waiting for an increase in his pay often has a long wait. The men in the shop ask for increased pay in the spring, not because of spring fever, but because they know that outside work opens up on a larger scale and a number of men will leave the shop. Those who remain feel more independent and they know that the time is ripe to ask for an increase. These spring demands are at times annoying to the foreman, but they are not quite so bad as it may seem.

There is always a way to avoid this annual bombardment without loss of incentive. By dividing the mechanics into several classes and having a rate set for each class, every man has a chance for an increase by preparing himself to fill a vacancy in the class ahead of him. Every firm can use several classes of mechanics for various work. The best mechanics do the accurate work and are entitled to the most money. This system leaves the others an opportunity to qualify for a better position.

—W. J. OWENS, *Foreman, Newport Rolling Mills Company.*

* * * *

THE · NEXT · TOPIC

"Experience or Authority?"

Hot-Pressed Brass Parts Production

General view of the department in which die-pressed parts are manufactured at the Ansonia plant of the American Brass Company

By Herbert Chase
Associate Editor, American Machinist

MANY non-ferrous parts made today as sand-castings could be produced with greater economy by the hot die-pressing process. It is unfortunate that the latter process is not more generally understood. Specific illustrations of the savings effected by substituting die-pressed for sand-cast parts were given in a preceding article. It remains to describe the pressing process itself as well as the dies and other equipment employed by the oldest producer of die-pressed parts in this country—the American Brass Company.

This concern not only makes the die-pressings and the dies used for the purpose, but also manufactures several types of copper-base alloys for use in the forgings, including manganese and aluminum bronzes, Everdur, a non-corrosive alloy containing copper, silicon, and manganese, and brasses of various analyses. A very large proportion of die-pressings are made, however, from bars composed of about 60 per cent copper, 2 per cent of lead, and the balance zinc.

In most instances the extruded bars used for die-pressings are of circular section, but other sections sometimes are employed, especially when the part to be made has an "X" or "T" section, or heavy sections joined by relatively light sections of considerable length. Occasionally the slug is bent or cold-formed (into a U-shape, for example) to make it conform more nearly to the shape of the die.

Bars are sheared into slugs on a crank press or gang-sawed into measured lengths weighing slightly more than the finished part. Sawing is done only when shearing deforms the slug so much that it will not stand readily in correct position in the die. Shearing is more rapid and wastes no metal. The diameter of slug used depends chiefly upon the shape of the die cavity. Best results are obtained and wear of the die is minimized when the metal does not have to flow too far in the die. When a "pan-cake" section is most advantageous, it is sometimes more economical to flatten out the slug in a preliminary hot-working operation than to cut thin slugs from a bar of relatively large diameter.

Slugs always are made of sufficient volume to fill the die cavity and produce some flash. Flash becomes less as the die wears. With new dies, slugs of slightly different size are tried until one that gives the desired flash with best working results is found.

With the Zeh & Hannemann screw press of the "percussion" type, a slug which is too large or too cold does not cause excess pressure on the die. Although the

force of the blow can be regulated by the operator, the maximum pressure is limited to a safe value. The stroke is not so rapid as to allow sufficient time for metal flow, nor yet so slow as to permit the metal to cool unduly and become too hard to work before the die cavity is filled. Even though a careless operator insert a new slug before the pressed part is extracted, no damage to a press of this type or the die is likely to result. The press has an adjustable stroke which fits it for using dies of different types and proportions.

These presses are operated by a friction wheel attached to the top of the coarse-pitch screw and contacting alternately with each one of a pair of friction disks on opposite diameters, and carried on the power shaft. Contact with one disk rotates the screw in one direction forcing the ram down, and contact with the other disk produces the reverse motion. The friction drive accelerates the screw wheel gradually as it descends, and, since the energy of the blow depends upon this speed and the die can be set at any desired height, the force of the blow can be graduated as desired. As the wheel comes to rest there is a certain recoil which starts it in the reverse direction. Several 500-ton and some 250-ton presses of this type are used in the American Brass Co., Ansonia shops, chiefly for making parts of fairly deep section as measured parallel to the ram motion.

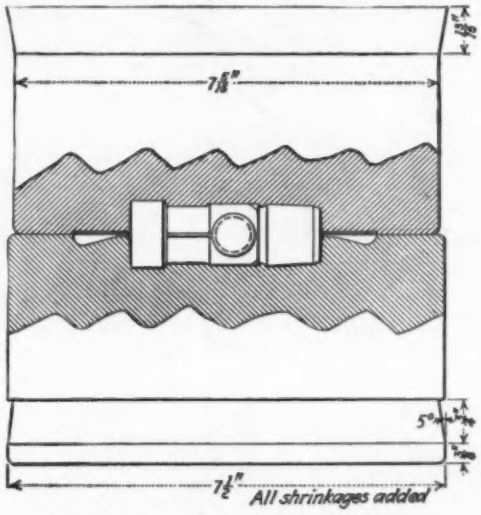


Fig. 1—Open die used for making hot-pressed parts of the class shown in Fig. 2

Smaller parts, especially those of thinner section, are made also on Standard Machinery Co. 400-, 500- and 800-lb. drop hammers. With these hammers the time interval for metal flow is less, and the metal is not displaced to the same extent as in the screw presses. The variety of parts made on drop hammers is not so great as on screw presses, but the production rate is somewhat higher. Hammers are not suited for making deeply cupped shapes or shapes with long lugs.

In the shop referred to, pressers are arranged on one side of an aisle and hammers on the other. At one end of these two rows of machines is a punch-press shear and at the other, saws for cutting slugs. Adjacent to each press and each hammer is a small double-ended furnace. Some of these furnaces are oil-fired and others gas-fired.

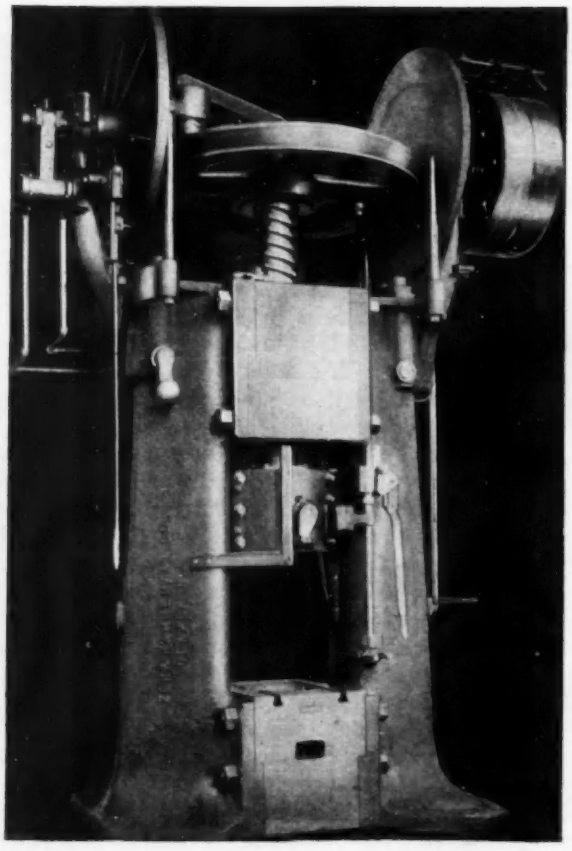
Slugs are piled onto cast iron trays which are loaded into one end of each furnace by a helper. Trays are pushed through the furnaces as rapidly as required by the press operators, who, in addition to feeding slugs to the presses, adjust furnace burners so that the slugs issue at the temperature required for best working, usually between 1,200 and 1,500 deg. F. The operator judges the temperature partly by the appearance of the parts as they come from the die, adjusting the temperature to avoid cracks or other defects in the piece.

A second pressman oils the dies and removes the parts from them, using a foot-operated knockout and tongs. Automatic air-operated knockouts are used on hammers and can be fitted to presses also. Hammers are operated by one man. Presses of 500-ton capacity produce from 2,000 to 3,000 pressings per 10-hour day; 250-ton presses turn out about double this number of pieces, but the latter, of course, are of smaller size.

Pieces from the presses and hammers are transferred in metal baskets by an overhead crane to a row of ordinary punch presses. Here the parts are placed in shearing dies which remove the flash, or fin. Scrap is kept separate for each material and is returned for remelting.

AFTER shearing, the pieces are loaded into wooden baskets having acid-resisting aluminum-bronze frames and are pickled for 15 min. in sulphuric acid, washed in cold water, dipped for 5 min. in a solution of sodium bi-chromate to brighten the surface, washed in cold water and then in hot water, inspected for flaws, and packed for shipment. Dimensional limits are maintained by the press- and hammermen who are required to check the size of pieces from the dies at least once an hour.

Surface finish of hot-pressed pieces naturally depends upon the condition and finish of the dies. Often the surface of parts is so smooth that the parts can be buffed with very little if any grinding. Die-cavities grow



This percussion-type of screw press is well adapted for the manufacture of hot die-pressed parts

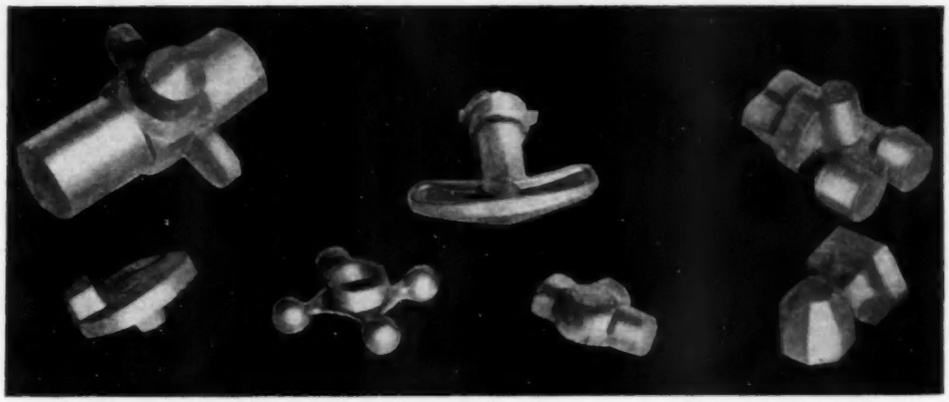


Fig. 2—This class of brass parts is readily made in open two-piece dies, similar to those used in making steel drop-forgings

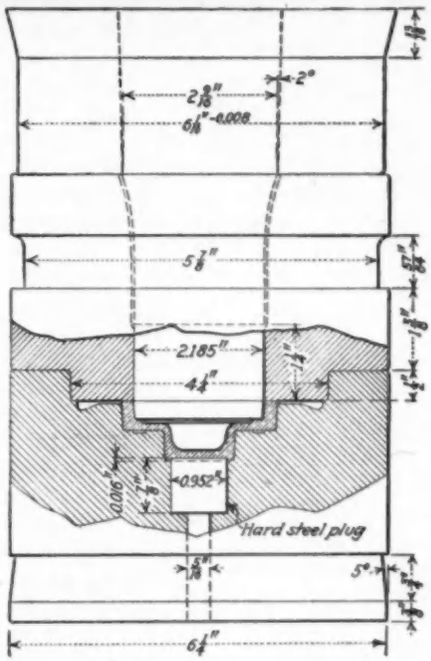


Fig. 3—So-called "extrusion" die in which a punch is incorporated to form a recess in the piece after the die blocks are closed

slightly larger with use and in time develop surface cracks which are reproduced on the pressings. Usually these blemishes are too slight to be of moment. In time dies require replacement. In the case of the American Brass Company, however, the cost of dies originally paid by the purchaser is rebated as parts are supplied, and thereafter dies are maintained or replaced as required without additional charge.

DIES used in forming hot-pressed parts must be made, of course, from steel that will withstand the high temperatures and pressures imposed without undue wear, deformation, or cracking.

Frequently minor changes can be made in a part to be die-pressed that greatly simplify the die work and reduce its cost accordingly. Die-makers prefer to work from forging drawings (such as are furnished to manufacturers of steel drop-forgings, for example), but often have to make up their own drawings from a blueprint of the finished part. Such drawings then are submitted to the purchaser for approval. He should always check them to see that suitable allowance is made for finish, that the draft usually required will not prove objectionable, and that dimensions of sections to remain unfinished fall within required limits. Ordinarily the die is made to give, when new, parts that are close to upper or lower limits, so that as wear occurs and the cavity enlarges slightly the pieces will not be oversize. In designing the die, due allowance has to be made, of course, for shrinkage in cooling.

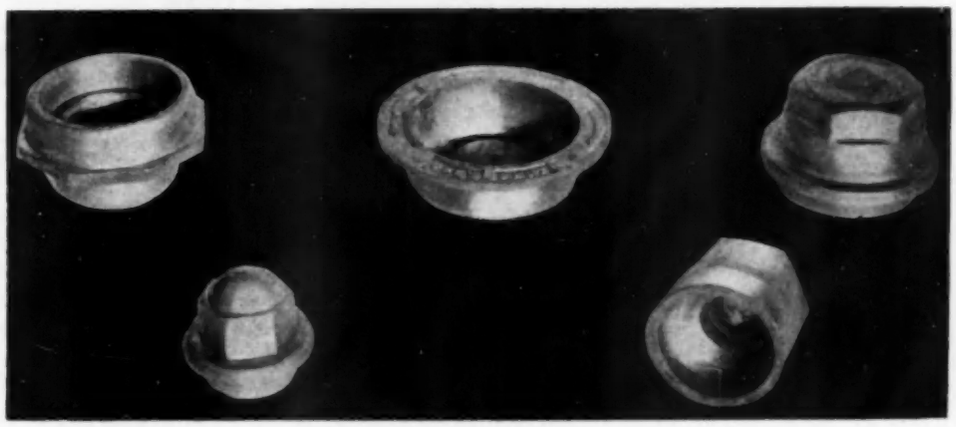
It is quite feasible to die-press pieces having straight holes with approximately parallel sides if their depth is less than or equal to their diameter. Tapered holes of depth considerably exceeding diameter also are made readily. In such cases, however, the hole must be so located that the punch will clear. Under-cut parts are produced in some cases, but in general it is well to avoid undercutting, as it is likely to increase die cost. Allowance for finish usually is $\frac{1}{64}$ in. on a side for small parts and $\frac{1}{32}$ to $\frac{1}{16}$ in. for larger parts. Most unfinished dimensions can be held within 0.005 to 0.010 in. Lettering or numbers frequently are sunk into the die, often on a removable plug, so that the lettering can be changed if necessary. Space allowed for flash varies from 0.023 to 0.060 inches.

DIE materials of a considerable variety are employed, depending upon the kind of metal to be worked, the probable number of parts to be made, the character of section, and other factors. Tobin bronze produces the least die wear of the alloys commonly worked. The brass alloy already referred to, is next in order, while nickel-"silver," Everdur and Avialite are harder on dies. It is common practice to shrink the die-proper into a holder made of less expensive steel in order to reduce die cost.

Three general types of dies are in general use. The most common type is the so-called "open" die, such as that in Fig. 1, made in two pieces. This die is similar to a drop-forging die for steel and is employed for making pieces of the class shown in Fig. 2. About half of the cavity is sunk into each of the two halves of the die.

The second type, sometimes termed an "extrusion"

Fig. 4—Examples of hot-pressed brass parts made in dies similar to that shown in Fig. 3



die because the metal is caused to flow through certain openings, is comprised of three parts: two die-blocks and a punch, as shown in Fig. 3. The lower die-block has a recess that is closed by the upper die block which fits into it and carries the close-fitting punch. In operation the die-blocks first are closed to the position shown, after which the punch is driven home by further motion of the press, the punch displacing or "extruding" the metal slug to fill the cavity. Recessed parts of the type illustrated in Fig. 4 are made in this class of die.

Dies of the third class, shown in Fig. 5, are employed for making parts having an offset portion and sometimes also a recess. Parts illustrated in Fig. 6 are of this kind. In this class the die usually is a three-piece type with the lower block split vertically so that it will separate and release the offset portion when the die opens. The outer surface of the lower block is conical and fits, of course, into a mating female holder, not shown. In the die in Fig. 5 the punch is made integral with the upper portion of the die block, but it could be made as a separate piece operating in the same way as the punch in Fig. 3, if desired. It would be possible also to make the lower conical portion of the die in more than two pieces if that were necessary to clear offset projections in more than one plane.

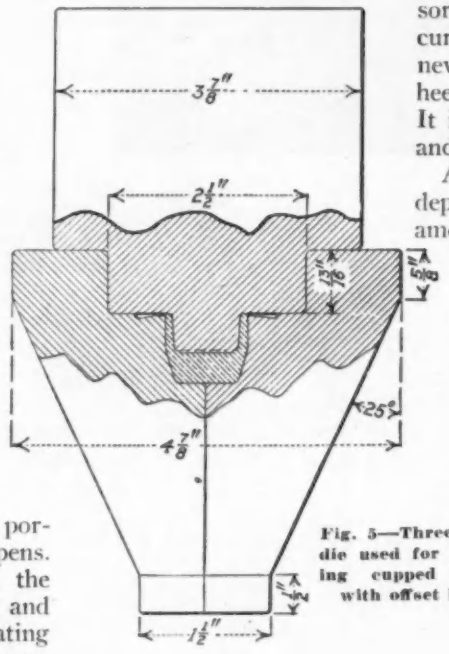


Fig. 5—Three-piece die used for pressing cupped parts with offset lugs

Whenever a knockout is required to free the pressed piece from the die, it can be incorporated readily. Fig. 3 shows such a knockout directly below the punch. It is actuated in the usual manner.

Fig. 6—Recessed parts with offset lugs similar to these are made in three-piece dies of the type shown in Fig. 5

From the foregoing description it is evident that the art of making die-pressed parts from copper-base alloys is well-advanced. Its advantages in respect to rapid production of the pressings themselves appear obvious, and when the good finish, the close tolerances possible, and the ready machining qualities are considered, there can be little doubt that die-pressed parts will find a wider field of application, together with an advance in the technique of the art in the future.

Safety Helps to Build Financial Independence

By Marin Phillips

WE HEAR a great deal today about building financial independence. While this campaign is sponsored by the banking institutions for the purpose of securing money for the operation of their business, it nevertheless carries a sound lesson that we all should heed. This cannot be looked upon as a one-sided affair. It is not their gain and our loss, but instead, their gain and our gain also.

A bank advertisement recently stated, "Five dollars deposited weekly at 4% interest will in fifteen years amount to $5,308.09." If we never read such statements as these we might never realize the real ultimate value of $5.00 saved weekly and working for us through the accumulation of compound interest. When the value of building for financial independence is first impressed upon us, we immediately think about saving a part of our earnings. Then, we think about earning more money, but we are likely to neglect the foundation of our building. That is, keeping free of accidents.

It doesn't take much of a permanent injury to place a man in a lower position where his earnings will be $5.00 per week less, and we have already seen what this loss amounts to over a period of years. We must guard ourselves against permanent injuries. Then we are in a position to face the competition of life; to win promotion that carries increased earnings. The big jobs require more effort and responsibilities. These cannot be met when we are handicapped through accidents that have left permanent injuries.

When a vacancy is to be filled through the promotion of some one in the department, the man selected must be more than physically fitted. He may have been lucky enough to have escaped any permanent injuries and yet have a bad record as an unsafe worker, thereby barring him from the promotion. In the race for promotion, the man who is not quite an expert in his line of work, but has a good safety record, will often win over the man who is an expert but has got the name for being an unsafe worker.

FIVE dollars per week taken from the wages of a young man through a permanent injury may mean the difference between just getting by and gaining world-wide recognition. Besides this, that $5.00 deposited weekly and drawing interest would accumulate sufficient funds to give that boy a good education, thereby giving him a better chance of winning success. Accidents may shape the failure or success of future generations as well as of our own, and none of us would wish to jeopardize the futures of our children through lack of either care or foresight.

Let us keep the possible accident costs drawing interest for ourselves, rather than for the doctors who specialize in repairs to the human machine. This we can do by continuing to work safely so that we will not be injured. This will also protect us from having an unsatisfactory safety record to bar us from promotions when the time comes.

IDEAS FROM PRACTICAL MEN

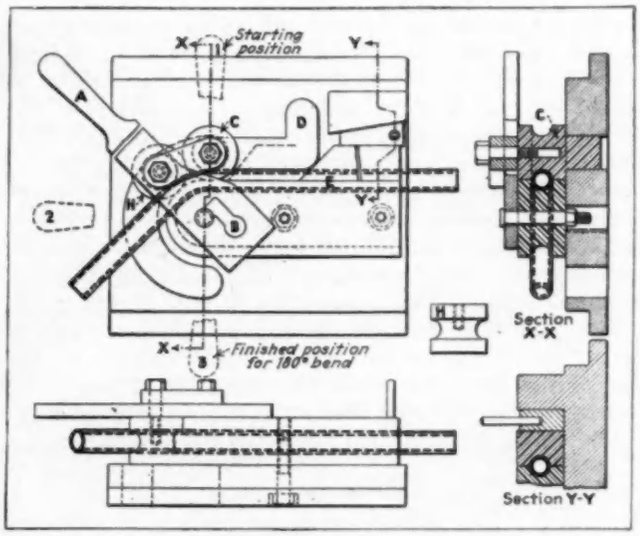
The department, "IDEAS FROM PRACTICAL MEN," is devoted to the exchange of information on methods useful to the machinery industries. Its scope includes all divisions of the metal-working industry, from drafting room to shipping platform. Descriptions of methods or devices that have proved their value are carefully considered, and those published are paid for. The rates are from a minimum of five dollars upwards, depending upon their merit.

Fixture for Bending Copper and Brass Tubing

BY JOHN J. ROETHLISBERGER
Tool Designer,
Westinghouse Electric & Manufacturing Company

IN BENDING copper and brass tubing, it is the custom in many shops to fill the tube with either sand or melted rosin, and heat the tube before bending. If the bend is a particular one, rosin is used and must be melted out of the tube after bending.

An inexpensive fixture for bending tubes cold, without filling them with either sand or rosin, is shown in the illustration. By the use of this fixture, tubing can be bent accurately and quickly in the following manner.



Fixture for bending tubes of copper and brass

To insert the tube, the lever *A* is removed from the fixture by bringing it into such position that the hole *B* engages the pivot pin, and so that the hub at the bottom of roller *C* goes into the upper part of the slot *D*. Since the hole *B* is larger than the head of the pivot pin, the lever can be lifted off without interference. The tube to be bent is then inserted through the slot *E*, being clamped by the wedge blocks at the right. The lever is replaced and moved into position 1. The left-hand end of the lower wedge block is placed as close to roller *C* as is possible, as shown by the dotted lines. Moving the lever to the left to position 2 will bend the tube to an angle of 90 deg., the roller *H* rolling it around the bending block in the center. If any distortion of the tube is caused by the roller *H*, roller *C*, traveling in a fixed path, will roll it back into shape.

If the tubing is to be bent 180 deg., it is first bent to 90 deg., then taken out of the fixture and turned end for end. It is put back into the fixture from the left and the bend is continued for another 90 deg. The reason for making the bend in two operations is so that the bending stress will be distributed throughout the bend, avoiding cracking or breaking of the tube.

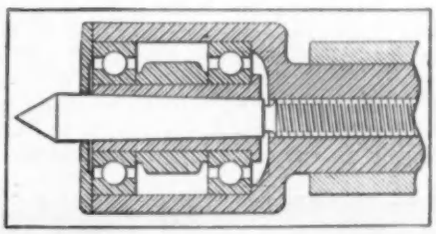
Live Tailstock Centers

BY W. P. CHILDS

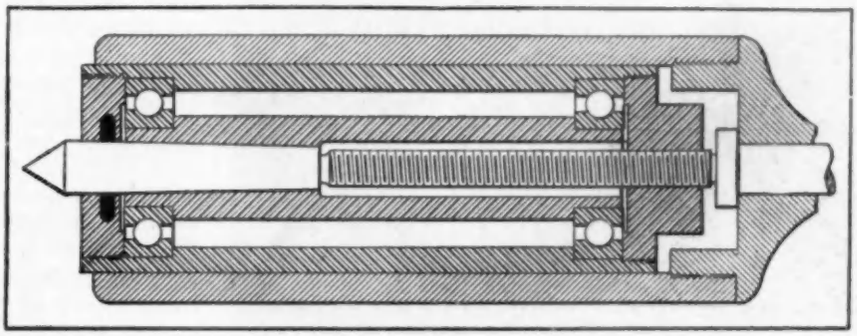
From time to time, I have noticed in the *American Machinist* that makers of machine tool accessories are bringing out various types of live centers. Many of these designs are good, but I am wondering how long it will be before the machine tool manufacturers will incorporate live tailstocks in their products.

While at first glance the increased size of the tailstock body may seem objectionable, I believe that herein lies the real solution to the live center problem. The ideal design is to have the tailstock use the standard type center which is easily replaceable at small cost.

The illustrations at the right and below show two alternate ways of accomplishing this.



While not as rigidly supported, a short sleeve keeps the size of the tailstock body down



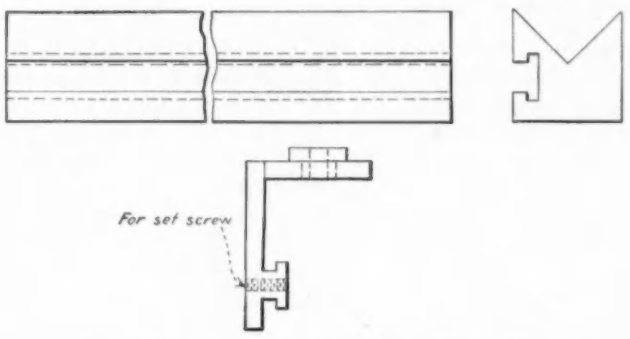
This design uses an inner sleeve running the full length of the tailstock body, providing maximum support

Adjustable Jig

By Charles R. Whitehouse
The Holtzer-Cabot Electric Company

For drilling round stock a V-block which locates the holes by movable bushings will be found convenient. This fixture may be used for any number of holes of varying size, and may be made of a size to fit the job.

The fixture is made from a piece of rectangular stock



Drill bushings are moved to any desired position

with a conventional V cut in the top and a T-slot in the side. The guides that fit the T-slot are made of two pieces of flat stock; as many may be used as desired. The top portion of each is drilled to fit a certain size of slip bushing; a tapped hole in the side piece is used with a thumb screw to clamp the guide to the V-block.

The first piece to be drilled is laid out; then the guides are moved to their proper places and the screw tightened. A stop may be screwed to either end of the block or a C clamp used instead. The guides should be drilled large enough to accommodate various sizes of bushings.

A Stripper for a Multiple Punch

By Wm. J. Tangerman
Shop Superintendent, Union Metal Products Company

In punching 25 holes, $\frac{11}{16}$ in. and larger in diameter, through the $\frac{5}{16}$-in. surface of a railway-car hopper door, as shown in Fig. 1, the weight of the door was insufficient to strip it properly from the punches. Special strippers were made, as the kind generally used were of little use because of the dispersion of the holes, the size of the punching head (approximately 3 x 4 ft.), and the irregular corrugated surface of the piece. The stripper unit illustrated in Fig. 2 was constructed to overcome the difficulty. It is a custom of this particular plant to locate and support punches and strippers for a multiple-punching operation by means of a plate bolted to the ram, the lower surface of the ram acting as a backing for punching and stripping. For this reason, the spring is held in the stripper cylinder by a light mild-steel cap which is backed by the ram in stripping. The body of the stripper is of cold-rolled steel, lathe-turned to size. The plunger is of tool steel, hardened, acting under the influence of a 700-lb. spring having $3\frac{1}{4}$ in. free height, and $2\frac{1}{4}$ in. solid height. In operation, strippers are spaced in convenient locations on the upper die plate. Eighteen were used on the die shown in Fig. 1. The preliminary design of stripper—a simple spring, is also shown.

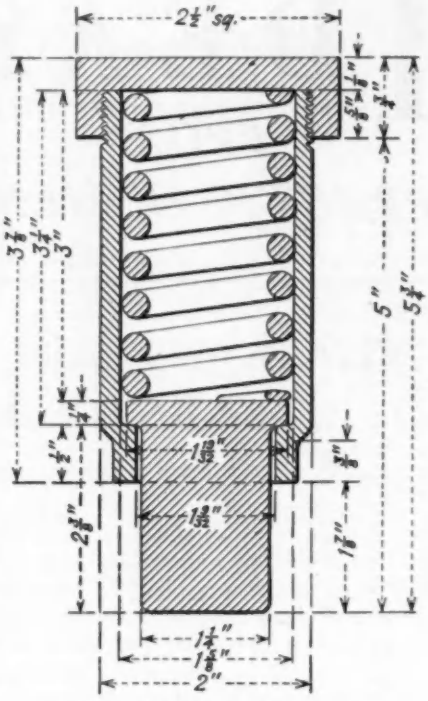


Fig. 2—Detail of stripper unit

When the ram descends, its force is sufficient to drive the stripper plungers into their holders against the action of the springs. When the punch head begins its return stroke, however, the stripper pressure is sufficiently strong to strip the piece from the punches.

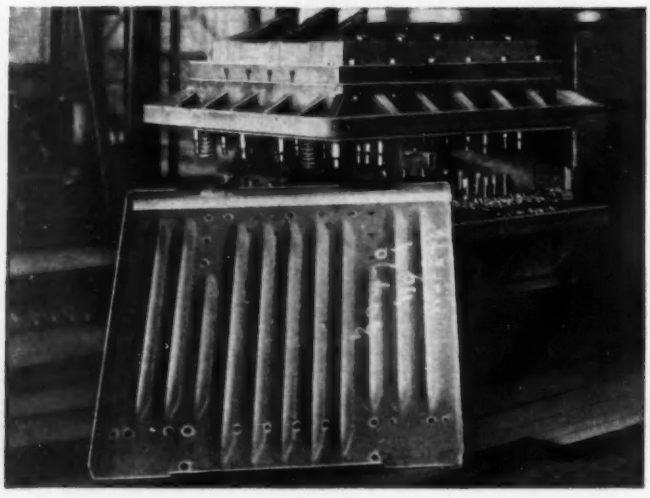


Fig. 1—Spring-operated strippers mounted on a punching ram

Plating Stainless Steel

By W. E. Warner
Brighton, England

It is sometimes necessary to plate stainless steel with silver, copper, or nickel. This can be done, but the ordinary plating solutions are not successful when applied to this work.

A good solution is a 25 per cent solution of sulphuric acid, using a lead rod as an anode and the stainless steel as the cathode. The voltage employed should be from four to six volts, and the temperature of the solution maintained at 10 to 80 deg. F.

Another solution that can be employed is a 30 per cent solution of hydrochloric acid. In this case a carbon anode should be used with the same voltage as before and the temperature maintained at 140 deg. F. Before being placed in the plating bath, the articles should be cleaned of all grease and scale. On removal from the bath after plating, they should be rinsed in an alkaline solution and washed in clear water.

Fusion Welding of Aluminum

Apparatus, Flames, Flame Conditions

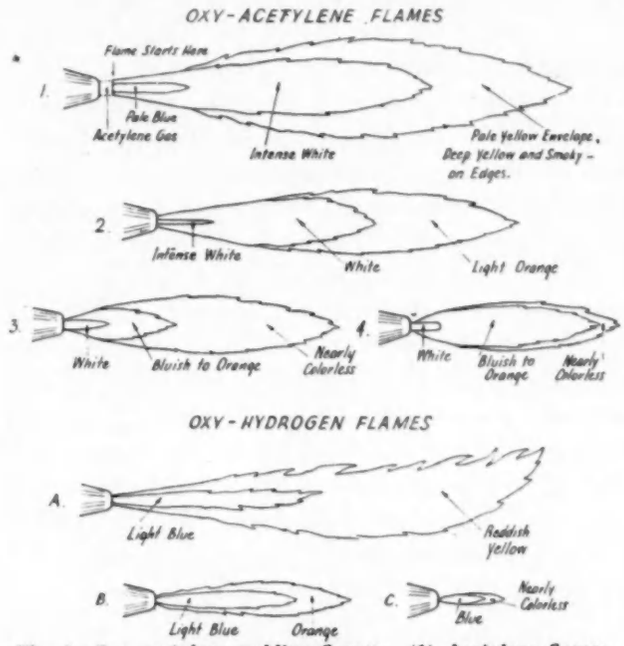


Fig. 1—Oxy-acetylene welding flames: (1) Acetylene flame; large intensely white, smoky at outer end, obtained when first lighting torch. (2) Carbonizing flame; small, intensely white cone close to torch tip, surrounded by another white cone, both clearly visible. Outside flame nearly colorless and of large volume. Should not be used for welding. (3) Ideal flame for welding; one white cone visible. Outside this is a nearly colorless flame of large volume. (4) Oxidizing flame, acetylene reduced. Should never be used for welding. Note: Oxy-hydrogen flames are described in the text.

AMONG the methods employed for joining aluminum and its alloys, it would be hard to find one more generally satisfactory than fusion welding with an oxy-hydrogen or oxy-acetylene torch. In the hands of an experienced aluminum welder the process is simple and rapid. It can be applied to metal of all thicknesses, and the resultant joint is not unsightly. In fact, if necessary, the weld can be finished off in such a way that it is impossible to detect the joint.

The same type of butt, lap, tee, fillet, and similar welds, as made in any other metal, are made in aluminum. But this metal has distinct characteristics involving a somewhat different technique from that required with other metals. This technique, however, is by no means difficult to acquire, for aluminum is most readily weldable.

The apparatus required for torch welding of aluminum is the same as that required for other metals. Detailed information regarding the handling of welding apparatus can be obtained from manufacturers of such equipment.

The selection of the correct size of torch for any particular work is largely a matter of experience. The data given in Table 1 may serve as a guide for the inexperienced welder. In this table the approximate sizes of tips and gas pressures to be used in welding aluminum of different thicknesses are given. The size of the tip must depend largely upon the shape and size of the object to be welded, as well as upon the thickness, since the larger articles have a greater capacity for heat and a larger radiating surface. The size of the tip also depends upon the skill of the welder.

In welding aluminum and its alloys it is preferable to use an oxy-hydrogen flame whenever it will supply sufficient heat for the job at hand. The oxy-hydrogen flame produces a cleaner and more satisfactory joint, and usually suppiies sufficient heat for welding metal up to $\frac{1}{8}$-in. in thickness. As indfcated in Table 1, a larger tip is used for hydrogen than for acetylene on any given gage of sheet.

Whether using hydrogen or acetylene, the torch should be carefully adjusted to show a neutral flame, since this gives the best speed and economy, as well as cleaner and sounder welds. The oxy-hydrogen flame is neutral when the volumes of the two gases issuing from the tip of the torch are balanced. If there is an excess of oxygen, the flame will be rather small and will have a very short cone at the tip of the torch as at *C*, Fig. 1. With an excess of hydrogen, the flame is long and ragged and there is no well-defined cone at the center, as at *A*. The neutral flame, in which the mixture of the two gases is properly balanced, as at *B*, has a well defined jet of blue cone in the center of the large flame.

TABLE I—APPROXIMATE SIZE OF TIPS AND RELATIVE GAS PRESSURES USED IN WELDING ALUMINUM OF DIFFERENT THICKNESSES

OXY-HYDROGEN

Metal Thickness B. & S. Gauge	Size of Orifice in Tip (Inches)	Oxygen Pressure (Lbs. per Sq.In.)	Hydrogen Pressure (Lbs. per Sq.In.)
20 Ga. to 18 Ga.	0.062	1	2
16 Ga. to 14 Ga.	0.078	1	2
12 Ga. to 10 Ga.	0.093	2	4
$\frac{1}{8}$" to $\frac{1}{4}$"	0.109	4	8
$\frac{5}{16}$" to $\frac{3}{8}$"	0.125	8	12

OXY-ACETYLENE

Metal Thickness B. & S. Gauge	Size of Orifice in Tip (Inches)	Oxygen Pressure (Lbs. per Sq.In.)	Acetylene Pressure (Lbs. per Sq.In.)
24 Ga. to 18 Ga.	0.031	1	2
16 Ga. to 14 Ga.	0.042	1	2
12 Ga. to 10 Ga.	0.051	8	6
$\frac{1}{8}$" to $\frac{3}{16}$"	0.062	12	8
$\frac{1}{4}$"	0.074	20	8
$\frac{3}{16}$"	0.084	25	8
$\frac{3}{8}$" to $\frac{1}{2}$"	0.095	25	8

A wide variety of flame condition is possible with acetylene by different adjustments of the torch. The one most suitable for welding aluminum is the neutral flame, secured by reducing the amount of acetylene until only one white cone is visible. Outside of this cone is a nearly colorless flame of large volume. This is the hottest flame, and it prevents excessive oxidation of the molten metals by providing a reducing gas envelope. To readjust the welding flame under practical conditions it is best to increase the stream of acetylene until two cones appear, and then decrease it until only one cone is visible. The various flames have characteristic sounds, which the welder usually learns to recognize.

Courtesy Aluminum Company of America

© American Machinist

American Machinist

Editors: KENNETH H. CONDIT AND FRED H. COLVIN

VOL. 72 NEW YORK, MAY 29, 1930 NO. 22

The S.A.E. Celebrates

ONLY a brief twenty-five years ago seven automobile engineers decided they ought to get together to discuss mutual problems. At that time there was no automobile industry and no one had any conception of the mighty structure that exists today.

In twenty-five years the industry has grown from a few scattered shops to a dominant position in American life. The Society of Automotive Engineers has increased in membership from seven to seven thousand. It has done much for the advancement of the industry, but unquestionably its greatest contribution has been its standardization work, which has saved the manufacturers and the consuming public many millions of dollars. S.A.E. steels, to name but one branch of the standards work, are recognized and used in many plants outside the automotive industry. To come so far in a quarter of a century is a real accomplishment. May the Society continue its good work and achieve even higher levels of success in the next twenty-five years.

*

Exhibits and Exhibitions

CLEVELAND was the scene of another large and well arranged mechanical exhibition during the week of May 12. There the American Foundrymen's Association, under the able direction of Secretary Hoyt, staged an impressive demonstration of the advances made in foundry machinery and practice. The displays were well designed, and no visiting foundryman could help but carry away new ideas.

A study of the exhibits impressed one with the extent to which various industrial fields overlap—how equipment designed for one field finds uses in others. Examples of this were seen in grinding machines and abrasives, cranes and hoists, gas and electric cutting and welding devices, conveyors, furnaces, ovens, industrial trucks, pneumatic and electric tools, punch presses and shears, optical instruments, sand blast equipment, speed reducers, X-ray equipment. In the arcade connecting the auditorium and the annex were to be found the non-commercial and educational exhibits. Here were booths for 18 colleges and technical schools, various engineering societies including those engaged in standardization activities, the government Bureau of Mines and Bureau of Standards, and an exhibit of the American Foundrymen's Association itself.

The attendance seemed small to those accustomed to the free-for-all souvenir-hunting days when hordes of curious non-buyers thronged exhibitions of this kind. But exhibitors have begun to realize the value of being able to conserve their energies for explaining details to those who are really interested and can understand. One may miss the excitement of the old-time crowds, but technical exhibits have entered a new phase which eliminates the atmosphere of the side show and gets down to business with those who come because they are really interested. Present day visitors do not require stunts to attract the eye. They are keen to know about spectacular and non-spectacular devices that promise to cut costs.

*

An Indication of Progress

FREE interchange of ideas and experiences has generally been considered to be characteristic of the intercourse of professional men, as contrasted with the traditional secretiveness of business men. What doctors talk about when they get together nobody knows, but the layman credits them with exchanging experiences for the general benefit of mankind. Engineers have been notably frank in their local and national meetings.

Management has only recently been looked upon as a profession, and therefore it would not be surprising to learn that the interchange of ideas between managers is somewhat less common. But the managers are making progress. At one of the recent sessions of the American Management Association, President Ching called particular attention to the freedom with which managing executives of large corporations are now revealing their methods.

Mr. Ching cited this practice as an evidence of progress. It is an evidence of progress, not only by the Association, but by the manager as well—progress from the amateur to the professional attitude.

SHOP EQUIPMENT NEWS

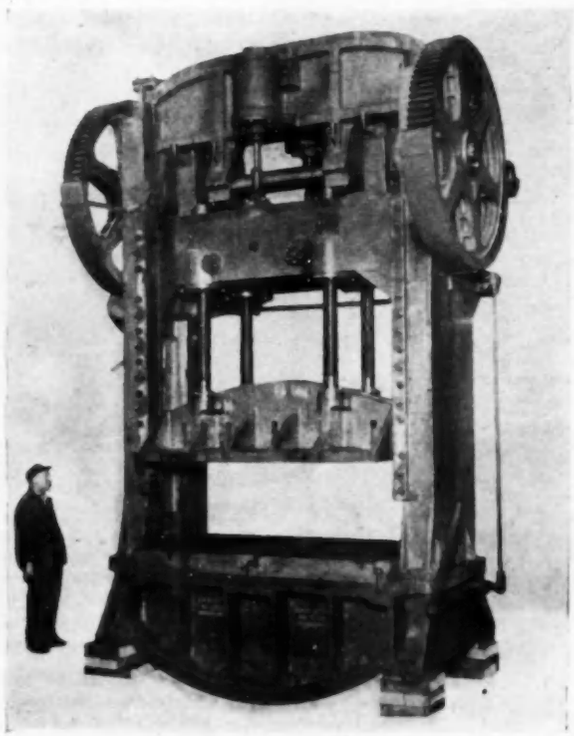
Bliss Double-Crank Presses with Four-Screw Slide Adjustment

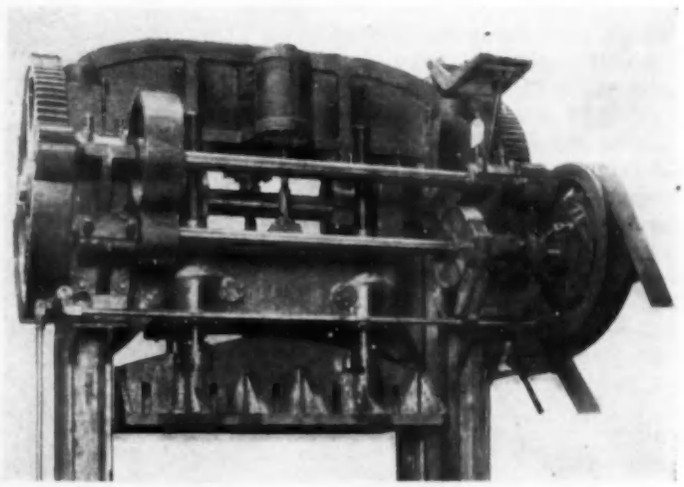
A RANGE of adjustments of several times the usual practice is found on the double-crank presses with four-screw slide arrangement announced by the E. W. Bliss Company, 53rd St. & Second Ave., Brooklyn, N. Y. The machine illustrated herewith has a range of 36 in. instead of 5 or 6 in. This large range of adjustment has been provided to give flexibility in press equipment used by automotive stamping plants and shops engaged in jobbing or limited production work. In these plants changes of dies ranging in height from a cowl or fender die to a comparatively low die for some flat piece may occur frequently. Heretofore, it has been the practice of such shops to use a press with enough die space to accommodate the highest die, and to provide some system of blocking or "ring risers" to adapt the press to the lower dies. To keep within the adjustment range, the blocking is usually designed as a series of machined slabs or "rings" from 4 to 6 in. thick and approximately covering the whole bed of the press. These must be set in the press and secured before placing the die. Each block requires as much care and time in handling as the die itself, and storage is a problem. The extra adjustment range provided on this press, therefore, does away with extra time for mounting dies and congestion in die storage.

In Fig. 1 the press is shown with the slide set to the limits, and the rear view shows a close-up of the driving mechanism. It will be noted that a pair of non-adjustable pitmans, "solid connections," link the crankshaft to a sturdy crosshead. The latter carries four nuts suitably geared to an adjusting motor, with fine adjustment by hand. These nuts revolve in unison to advance the screws, which are flanged and bolted to the slide. Among the advantages resulting from this arrangement are:

1. The solid connections are many times stronger than any adjustable one.
2. Pressure is applied to four points on the slide instead of two, thereby reducing the stresses and improving the alignment.
3. The screws become true compressive members, being free from the bending moment due to friction which occurs in the screw of an adjustable connection.
4. The air cylinder, or springs, for counter-weighting the slide have only the stroke of the slide and clearances are constant throughout the whole range of movement.
5. The crosshead provides better means for mounting the adjusting mechanism than is afforded either by the wrist or by the universal joint mounting.

In Fig. 2 is shown the latest Bliss design of driving mechanism. The flywheel, which runs on Timken bearings, is combined with an improved multiple-disk clutch. A separate brake drum serves to keep the heat generated by the brakes away





A range of adjustment of 36 in. on the Bliss Double-Crank Press with Four-Screw Slide Adjustment permits the use of deep automotive dies or low dies for flat pieces without the use of "ring risers." In the rear view can be seen the multiple-disk driving clutch and the "cartridge" type Timken bearings employed for the shaft

from the clutch. Removal of the outboard bearing allows the removal of the clutch disks without dismounting the shaft, should they require new facings.

A further refinement of design is the use of Timkens for the driving-shaft bearings. These Timkens are fitted with "cartridge" mountings, permitting the shaft and bearings to be hoisted out of the back brackets as a unit when assembling or taking down the press. In addition, cleaner working conditions at the back of the press are obtained from the fact that grease seals are employed.

Specifications of the No. 8E, 108-in. press illustrated are: crankshaft and crankpin diameters, 8 and 9 in.; stroke, 16 in.; strokes per minute, 15; distance bed to slide, stroke down, maximum, 60, minimum 24 in.; thickness of bolster, 7 in.; width between uprights, 108 in.; area of bolster, 60x107 in.; area of slide face, 60x100 in.; area of bed opening, 29x99 in.; height from top of bed to top of crown, 196 in., to top of motor, 212 in.; floor space over all, 115x187 in.; main motor, 20 hp., 1,200 r.p.m.; adjusting motor, 7½ hp., 1,200 r.p.m., and weight, 140,000 pounds.

Improved "Multimechanic"— A Multiple-Operations Machine

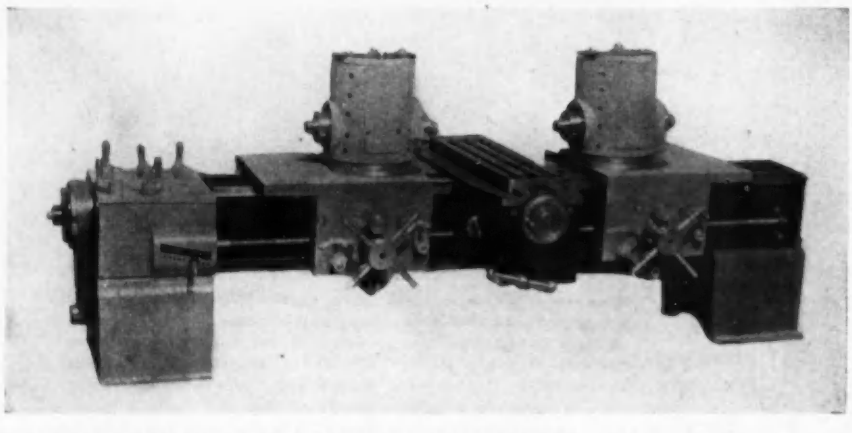
GENERAL redesign of the "Multimechanic," a multiple-operations machine, has been effected by the Production Engineering Company, 1848 West Broadway, Spokane, Wash. The machine was formerly built by the Simplex Manufacturing Company of the same city, and the original description appears on page 903, Vol. 71, of the *American Machinist*. The various machining operations, such as milling, boring, drilling, and engine and turret lathe work, may be handled, either on a single machine or on a line-up.

The machine is built in two sizes adaptable to heavy production work and light shop use. These are known as the No. 7 and 14, respectively, the maximum swings being 26 and 42 in. over the bed, and over the table 20 and 32 in., the minimum swings over the table being 6 and 4 in. The lengths and widths of the work tables are 36x10 in. and 42x12 in., and the distance between centers on a 10-ft. bed are 72 and 60 inches.

Both machines have 12 spindle speeds, the right-hand spindle giving 7 to 1,472 r.p.m., and the left-hand spindle 28 to 368 r.p.m. Vertical travel of the spindles is 7 and 14 in. for the Nos. 7 and 14, respectively, and the vertical feeds are from 1 to 2 in. per minute.

The workheads are of cylindrical form. They are turreted on large annular dove-tail ways and held against movement by vise-like locking devices. Quick reverse of the vertical feeds is provided by levers on the top of the heads, and longitudinal feeds are controlled by levers at the aprons. These workheads turret through the full circle, the indexes reading in ½ deg. from 0 to 90 deg., inclusive. The length of the cross table feed is 24 in. for the No. 7 size, and 30 in. for the No. 14 size. Quick-change gears provide 2 to 64 threads per in. These gears are of hardened steel and run in an oil bath. The double-ended spindles are 23½ in. and 30 in., respectively, and are mounted on Timken roller bearings.

The spindles are reversed, elevated, or lowered, either individually or together. The reverse levers for the spindles are located on the aprons, whereas the speed levers for both the spindles and the quick-change gears are located on the left-hand end of the bed. The machine has been designed to meet the demand for reduced re-settings of the work pieces. It is particularly designed for applications where changes in design of the work pieces are frequent, and to take care of small lot production of special parts.



Complete redesign of the "Multimechanic" Multiple-Operations Machine has provided greater accuracy and higher spindle speeds

Trent Electric Babbitt Pot With Spout

Pouring of large bearings on heavy machinery is simplified by the use of the electric babbitt pot with a spout valve mechanism, built by the Harold E. Trent Company, Philadelphia, Pa. Tipping the ladle does not afford sufficiently close control of the stream of metal into the pillow blocks, and consequently this pot has been equipped with a handwheel which will permit the pouring of 400 lb. in

By means of a spout on the Trent Electric Babbitt Pot, over 400 lb. of babbitt may be poured evenly in less than one minute

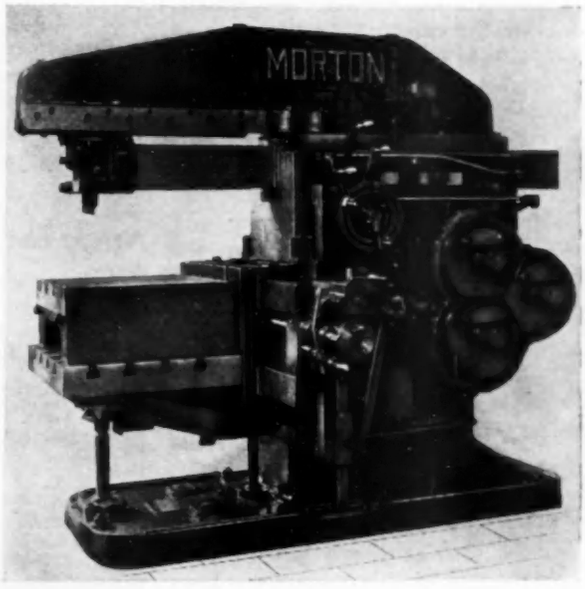
less than one minute in a steady stream. The spout guides the stream wherever it is wanted, and if the bearing fills before the pot is emptied, a quick twist of the valve-wheel shuts off the metal before it overflows. All parts of the control mechanism are entirely outside of the melting chamber, leaving the latter free from all obstacles to easy stirring and cleaning up after a melt.

Attached to the pot housing is an automatic temperature controller that assures correct heating right up to the instant of pouring, provided the power cable is kept attached to the pot during the transportation to the work, an arrangement which may be effected readily. However, when such continued heating is not convenient, there is said to be sufficient residual heat to keep the temperature at the proper point for a considerable period of time.

Morton Draw-Cut Shaper with Overhead Ram Bearing Extension

TO INSURE rigidity and eliminate spring or deflection of the ram, regardless of the length of stroke, an overhead extension ram cap bearing and screw type outer support have been applied to the heavy-duty, draw-cut shaper manufactured by the Morton Manufacturing Company, Muskegon Heights, Mich. This construction insures alignment of the table and work at all times. This construction can be furnished on the 32-, 38-, 48- or 60-in. stroke machines, and is of value in die shops, industrial shops, and railroad shops.

The overhead ram cap bearing is of box ribbed construction, the front or operating side of the machine being open on three sides so that the operator may stand in the most advantageous position for setting and removing the work and operating the machine. It also provides freedom for the removal of chips.



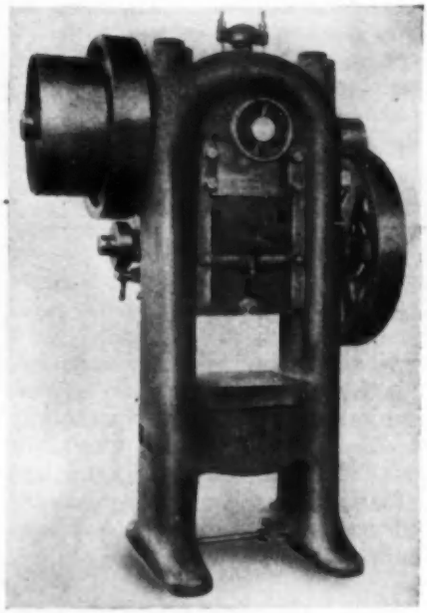
Morton Heavy-Duty Draw-Cut Shaper fitted with an overhead extension ram cap bearing and screw type outer support to obtain rigidity and maintain alignment on heavy work

A special tool head is used, which has an adjustable taper bearing, forming a support to the cutting tool, both top and sideways, and minimizing deflection of the ram. It is fitted accurately to the threaded end of the ram and may be held at an angle when desired by means of a quick clamping device. It is also provided with a radially adjustable bearing above the cutting tool and with a wedge taper bronze gib for compensating for wear. The bearing against which the head operates is made of special metal, and is fitted to the extended ram cap bearing in such a manner that it may be removed and refitted if necessary. Rapid power traverse, both horizontal and vertical, is also standard.

The illustration also shows an outer type screw support to the table to assure alignment of the table and work. There are no outer support bolts to tighten.

Zeh & Hahnemann Pillar Toggle Presses

Practically uniform speed of the slide toward the end of the down stroke is obtained on the pillar toggle presses announced by the Zeh & Hahnemann Company, Newark, N. J.



Uniform speed of the slide towards the end of the down stroke is a feature of the Zeh & Hahnemann Pillar Toggle Press

All of these toggle presses are particularly adapted for extruding collapsible tubes, but are also suitable for doing ordinary embossing work. The motion is controlled by the "Z. & H." non-repeating clutch.

The accompanying illustration shows the No. 12 size, which is rated to yield a pressure of 150 tons normally, but has been tested to an overload of 50 per cent. This press weighs 12,000 lb., and is backgeared in the ratio of 6½ to 1. It operates at a speed of 40 strokes per minute. The solid frame is reinforced by hot shrunk steel stanchions. Frequently these presses are equipped with automatic feeds.

"Blue Diamond" High Speed Drills

Different design from the regular small high-speed drill and a special heat-treatment are claimed to give "Blue Diamond" high speed drills the

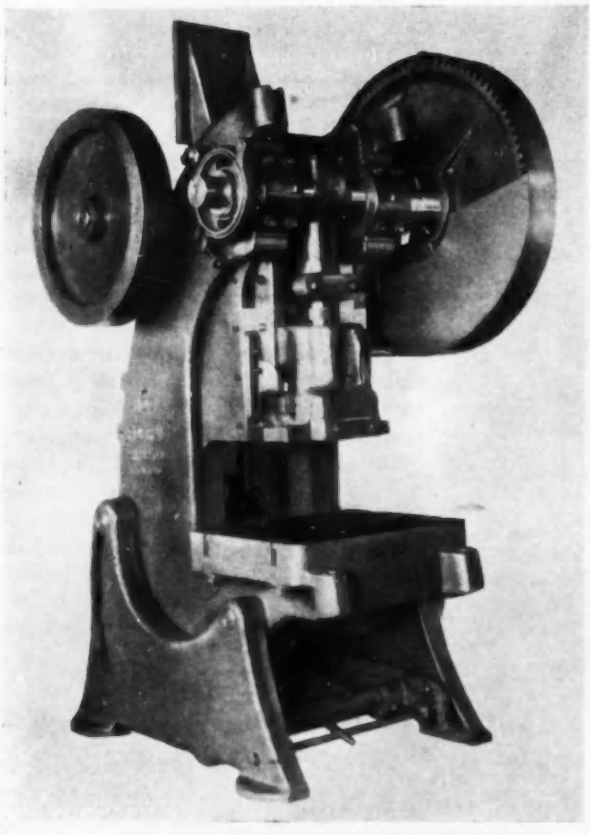
ability to penetrate faster on steel forgings, cast iron, cold rolled steel, brass, bronze, aluminum, and alloyed metals. These drills are produced by Whitman & Barnes, Inc., Detroit, Mich., and are claimed to reduce breakage, increase production, lower tool cost, and lower production cost. They are furnished in jobbers' sizes from $\frac{1}{16}$ to $\frac{1}{4}$ in. by 64ths and wire sizes from No. 1 to 55, inclusive. They are packed in a special yellow package and receive their name from their bluish color.

Federal Open-Back, Inclinable Punch Presses

Another addition to the line of open-back, inclinable punch presses manufactured by the Federal Press Company, Elkhart, Ind., is the No. 7 size illustrated. This machine is made in both the flywheel and geared types. The latter, illustrated, has a capacity of 75 tons and a total weight of 14,000 lb. It is equipped as standard with Timken roller bearings in the backgear bracket and has a bronze removable bushing in the flywheel.

The crankshaft is $4\frac{3}{4}$ in. in diameter at the main bearings and $5\frac{1}{2}$ in. in diameter at the crankpin. The machine is lubricated by large oil pockets in the caps, from which felt pads carry the oil to the shaft. The press has a bolster area of 28x36 in., and a die space of $13\frac{1}{2}$ in. from the bed to the ram, stroke down and adjustment up.

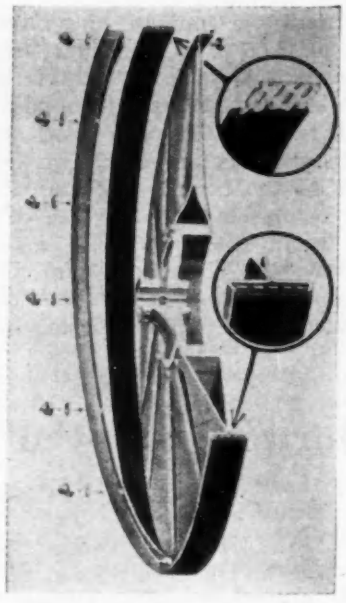
The machine illustrated is arranged for direct motor drive, the motor bracket being mounted on the top of the machine and the motor driving directly to the balance wheel. Ease in operation and set up, along with massive construction, are other features.



Federal No. 7 Geared-Type, Open-Back, Inclinable Punch Press, which has a capacity of 75 tons and weighs 14,000 pounds

Carter Quick-Change Tire and Detachable Rim Wheel for Bandsaws

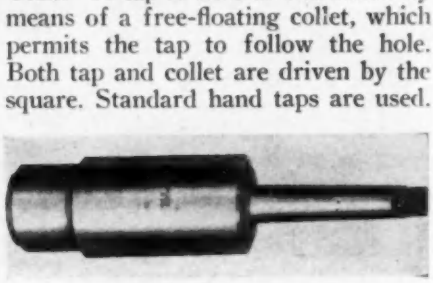
For use both as an integral part of new machines and for replacement on existing machines, the Carter Products Company, Grand Rapids, Mich., has announced a quick-change tire and detachable rim wheel for bandsaws. The quick-change tire may be applied to any saw in use by means of the Carter adapter wheel — a rigid, die-stamped, double-disk, electric-welded unit embodying whatever make of wheel hub is necessary to fit the saw used. When the tire requires replacing, a spare is put on, an operation requiring only a few minutes. Thus it is not necessary to ship the wheel back to the saw manufacturer when re-tiring is necessary. The tire embodies a flexible, endless steel perforated core or backbone molded into tough, black rubber. The steel core, floating on rubber all around, transmits the saw load around the entire tire, according to the manufacturer. A series of perforations in the steel backbone permit the rubber surrounding it to flow through properly, thus cushioning the saw contact and permitting unusual wearing qualities. This tire is designed for and adaptable to any high speed or low speed bandsaw.



Component parts of the Carter Detachable Rim Wheel for Bandsaws and a magnified portion of the tire

Apex Large Friction Chuck

A large size friction chuck having the same general design as previous models has been announced by The Apex Machine Company, Dayton, Ohio. A tap is held in the chuck by means of a free-floating collet, which permits the tap to follow the hole. Both tap and collet are driven by the square. Standard hand taps are used.



Apex Large Size Friction Chuck having a capacity for 1½ to 3-in. taps

The body of the chuck is 5 in. in diameter by $7\frac{1}{2}$ in. long, and is furnished with either a No. 5 or No. 6 Morse taper shank as standard or special shank on order. It is designed particularly for tapping large-size bottom holes in one operation, and for setting corresponding size studs and

nuts on heavy machines, such as compressors, gas engines, and locomotives. The tap capacity is 1½ to 3 inches.

Niagara No. 101 Press

For light stamping jobs, the Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y., has put on the market the No. 101 press, which has provision for quick attachment of a motor bracket. This press is small and rapid-acting, and is particularly convenient for light punching and forming operations in making buttons, small electrical pieces,

Light punching and forming operations can be handled on Niagara No. 101 Press

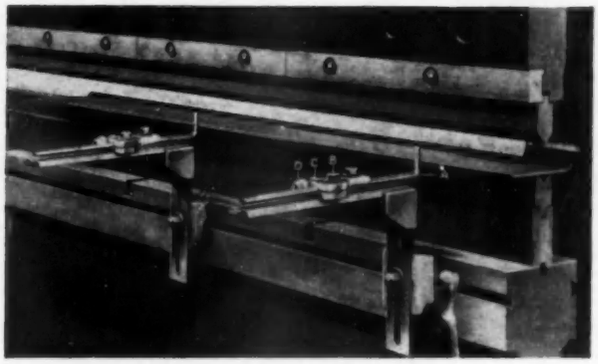
trimmings, and other similar articles.

The application of the bracket converts the press from belt to individual belted motor drive. The bracket carries a self-adjusting, ball-bearing idler, which keeps the belt under proper tension and increases the arc of belt contact to cut down belt slippage. It is of welded steel construction, giving rigidity and good appearance.

The No. 101 press is the smallest of the Niagara line. The shaft is of the eccentric type and is fitted with hand-scraped bearings. Long V-shaped gibs guide the slide, the motion of which is controlled by a foot-operated pin clutch of simple design. The No. 101 press can be furnished for bench use, or a table can be supplied. A bolster plate or die holder is optional equipment.

Cincinnati Universal Gages for Press Brakes

Full horizontal and vertical adjustment is supplied on the universal gages for press brakes available from the Cincinnati Shaper Company, Elam St. and Gerrard Ave., Cincinnati, Ohio. These gages are fitted with



Cincinnati Universal Gages set up on a press brake

micrometer adjustments and may be used either on the front or the rear of press brake. The horizontal gage rod *A* can be quickly moved to the approximate gaging position and clamped in place with cap screw *B*. Final adjustment is then made with micrometer nut *C* and the lock nut *D*. The gages can be set for forming wide and narrow sheets either upward or downward, and also used as an adjustable two-step gage for making both bends of a channel successively with only one handling of the sheet.

The gage rod *A* may be replaced with any ½-in. rod, and this can be notched for a step gage or bent to any desired shape for gaging a special bend. The gages are marketed in sets of two, complete with a suitable wrench.

Hannifin Four-Jaw Duplex Pneumatic Chuck

To widen the range of parts that can be held in a pneumatic chuck in a turret lathe, the Hannifin Manufacturing Company, 621 S. Kolmar Ave., Chicago, Ill., has developed a four-jaw duplex pneumatic chuck to hold odd-shaped pieces where the usual three-jaw chuck would be impractical. It is designed to replace special chuck fixtures or a hand-operated four-jaw chucks with independently adjustable jaws when it is necessary to chuck rough castings and unfinished forgings.

The duplex pneumatic chuck centers work across two diameters regardless of variations from nominal dimensions in them, applies uniform pressure on all sides, and permits loading and unloading the chuck jaws as quickly as with a conventional three-jaw air chuck. The fact that the chuck will take care of variations up to ⅜ in. across two diameters indicates the wide range of irregularly shaped work which can be handled with a chuck of this type.

The Hannifin chuck is a combination of two, two-jaw chucks with the necessary construction that permits each pair of opposing jaws to operate independently. In other words, one pair of jaws will move toward the center until contact is made with the work and the other pair will continue to move a greater or less distance until contact is made.

The illustration, Fig. 1, shows a 28-in., four-jaw duplex chuck holding a triangular-shaped punch holder. This piece is a rough casting and the operation to be performed is turning

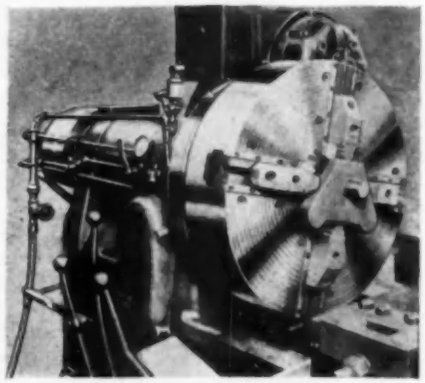


Fig. 1—Hannifin 28-In Four-Jaw Duplex Chuck mounted on a turret lathe

the shank and facing the top of the casting. It is necessary to center this casting across two diameters to center the shank accurately for turning. This part was previously held in a hand-operated, four-jaw chuck

of the independent jaw type, and chucking time usually consumed from 15 to 30 min., depending upon the size and shape of the casting.

A special two-in-one air cylinder has been developed for the operation of this chuck. Two pistons are provided, the smaller one telescoping inside the larger. The bore in the larger piston becomes the cylinder wall for the small piston. The larger piston is connected with one pair of jaws by means of a draw tube, and the smaller piston is connected with the other pair of jaws by means of a draw rod, the draw rod of the smaller piston passing through the draw tube of the larger one. The area of each piston is practically the same, with some allowance in the larger one to compensate for friction. As a result the power of the air cylinder is equally divided between both pairs of jaws. The duplex air cylinder is no larger in diameter than the standard rotating air cylinder and the length is only slightly greater.

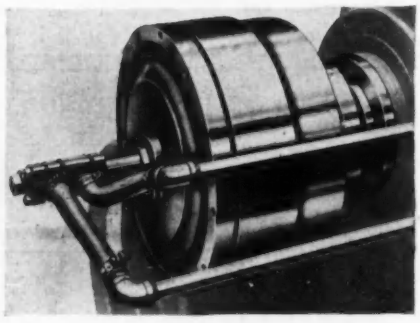


Fig. 2—Two-in-one air cylinder for the operation of the Hanniffin Duplex Four-Jaw Chuck

The duplex chuck is available in sizes of 15, 18, 21, 24, 28 in. The air cylinders are furnished in 12-, 14- and 16- in. sizes.

Lincoln "Lightweld" Welding Rod

For use on light gage material, a "Lightweld" welding rod has been placed on the market by the Lincoln Electric Company, Cleveland, Ohio. It can be used on 16, 18, 20 or 22 gage in making lap, butt, or corner welds. It gives a dense weld free from pin holes, and is designed to be used with a manual carbon arc at from 30 to 60 amp. d.c. It is suitable for horizontal, vertical, or overhead work. The size available is $\frac{1}{16}$ in. in diameter by 30 in. long and is put up in 10 lb. containers.

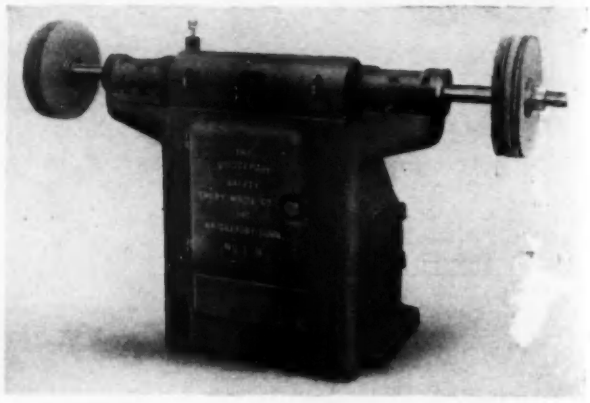
The carbon used with a "Lightweld" welding rod should be $\frac{5}{32}$ in. in diameter and tapered gradually from a sharp point back about $1\frac{1}{2}$ in. It should be gripped in the holder about 2 in. from the point. A head shield should be used by the operator to leave both hands free. The carbon should be held in one hand and the electrode in the other, the electrode held directly over the seam with the end of the wire tight down against the sheet. The position of the other end of the wire should be fairly close to the work, so that the wire at the weld lies fairly flat and does not rise too abruptly from the weld, an angle of about 15 deg. being about right. The carbon should be held at an angle of about 60 deg. to the sheet and pointed in the direction of the welding. The arc should be kept at such a length that there is a continuous bead of molten metal from the rod to the crater.

A 100-amp. machine is desirable, although not necessary. The setting should be set so that the proper current is obtained at the highest open circuit voltage. Speeds of from 7 to 18 in. per minute can be obtained.

Bridgeport Nos. 16M and 17M Buffing Lathes

Large or awkward work can be buffed or polished on the Nos. 16-M and 17-M motor-driven buffing lathes announced by the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn. They are also valuable where a satisfactory spindle speed is obtainable with direct-connected a.c. motors. By changing the driving sheave on the motor, any one of the range of speeds may be obtained with a V-belt drive. These are 2,000, 2,200, 2,400, 2,600, 2,800 and 3,000 rev. per minute.

The wheel spindle is carried by four sets of ball bearings, two being carried in each housing. The housings are dustproof and arranged with large oil reservoirs. The spindles are of high-carbon steel, ground, and the tight collars are force fits. A locking pin is built into the machine by which the wheel spindle may be locked rigidly when changing wheels.



V-belt drive on Bridgeport Motor-Driven Buffing Lathe permits the use of any one of six spindle speeds ranging from 2,000 to 3,000 rev. per minute

The machines range from 5 to 10 hp. in size. Regular equipment includes: automatic starter, overloader and under voltage protection, push-button control, ball-bearing spindle and motor, and two sizes of sheaves. Approximate floor space requirements range from 65x23 to 77x25 in. and the weights range from 1,050 to 1,260 lb. crated.

"Comtorplug" Model AR Comparator

A plug-gage type of comparator, known as the Model AR "Comtorplug," has been developed by The Comtor Company, Waltham, Mass. The "Comtorplug" equipment consists of one amplifier and a number of interchangeable expansion plugs and reference standards, one for each

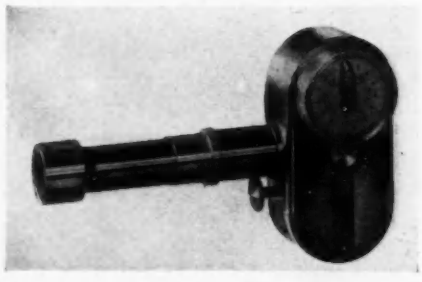


Fig. 1—Model AR Rotary "Comtorplug," which may be inserted in a hole being ground, while the machine is running, to ascertain the size

size of hole. Any plug can be placed in the amplifier in a few seconds. The measuring end of the expansion plug is ground straight and cylindrical while it is contracted to its smallest size. At the working size it is slightly oblong in cross-section, and slightly back-tapered. It is claimed that this form gives ample and durable contact surfaces, located at the forward end of the gaging head, and reaching to the bottom of a hole or counterbore, thus being effective for exploring out-of-round, taper, and

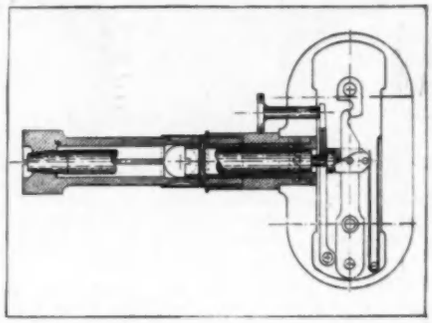


Fig. 2—Standard construction of the "Comtorplug," made for gaging from ¼-in. holes up

bell-mouth conditions, or in measuring between flat surfaces.

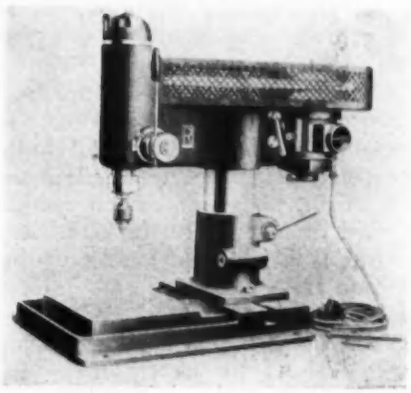
The expansion plug is contracted, placed in the hole, and released in the gaging position. It is not pushed into the hole under pressure. There is therefore no danger of scoring or damaging the work, and very little wear results on the contact surfaces. Moreover, with the Comtorplug kept adjusted to zero in a ring gage or with gage blocks, wear has no effect on the size produced, because the expansion plug is both self-centering and self-aligning.

As shown in Fig. 2, the mechanism of the Comtorplug amplifier is simple, sturdy, and well protected. The Model AR shown has a special large dial graduated in tenth thousandths, to eliminate eye-strain in continuous use. For gaging exact internal screw threads an expansion plug is supplied with a corresponding external screw thread, adjusted to a reference master.

"Express" High Speed Drilling Machine

Spindle speeds from 1,750 to 20,000 r.p.m. are found on the "Express" high speed drilling machine introduced into the United States by the Ambold Machine Tool Corporation, 50 Church St., New York, N. Y. This machine is of German manufacture and is especially adapted for the makers of counters, clocks, instruments, and electrical parts of steel and non-ferrous metals. Holes can be drilled up to $\frac{1}{8}$ in. in light metals, $\frac{5}{16}$ in. in brass and $\frac{1}{4}$ in. in steel. The spindle and the step cone have entirely separate bearings so that the drilling spindle is free fom belt tension. Feed is obtained by means of a sensitive lever which can be lengthened or shortened as desired. As soon as this lever is partly or entirely released, the drilling spindle returns to its previous position, fixed by a stop ring. A brake attached to the spindle prevents it from striking too hard against the bearing, and prevents the loosening of the drill chuck. The stop gage is graduated, and can be adjusted to any depth of hole which is desired. Both bench and column types may be had. The drilling spindle is driven by a vertically fitted motor, for d.c. or a.c., by means of a flat endless belt.

Specifications of the bench type are as follows: Distance from column to center of spindle $7\frac{7}{8}$ in.; diameter of spindle in sleeve, $\frac{7}{8}$ in.; depth of holes drilled, $2\frac{3}{8}$ in.; spindle taper, No. 2 Morse; maximum distance between drill chuck and table with $2\frac{3}{8}$-in. drill chuck, $7\frac{1}{8}$ in.; vertical adjustment,

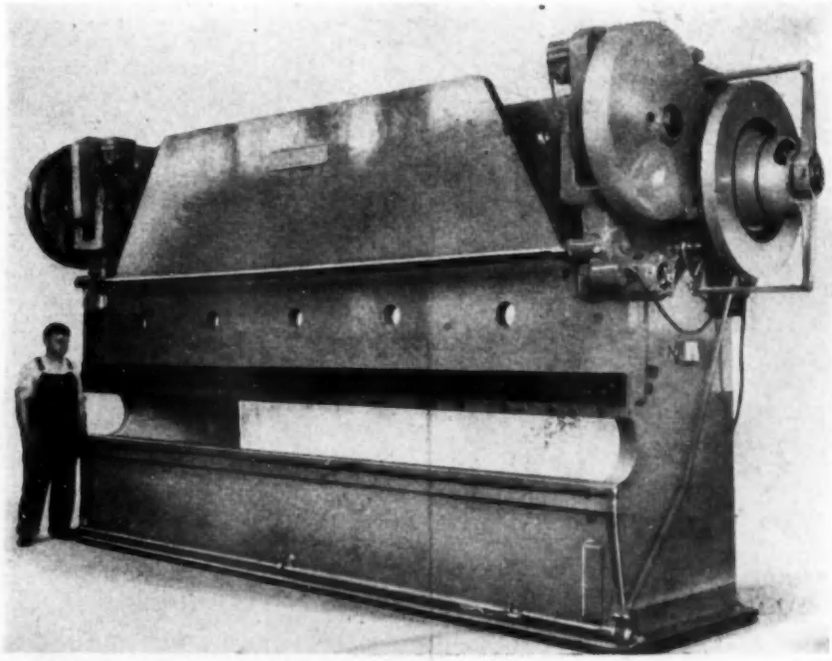


Spindle speeds up to 20,000 r.p.m. are obtained on the "Express" High Speed Drilling Machine intended particularly for drilling non-ferrous metals

3 in.; working surface of table, $11\frac{7}{8}$ in. x $9\frac{7}{8}$ in.; hp. required, 0.5; total height, 2 ft. 10 in.; bench space required, 2 ft. 11 in. x 1 ft. $8\frac{1}{2}$ inches.

Cincinnati 16-Ft. Press Brake

Over-all die surface of 16 ft. and a distance of 14 ft. 6 in. between the housings are specifications of the press brake built by the Cincinnati Shaper Company, Cincinnati, Ohio. All the main members are made of rolled steel plates and the machine has a capacity to form, without overload,



Cincinnati Press Brake with an over all die surface of 16 ft. to form ⅜-in. plate to a ⅝ in. inside radius over a 1½-in. die

right angles in $\frac{3}{16}$-in. steel, 16 ft. long, over a $1\frac{1}{2}$-in. die to a $\frac{3}{16}$ in. inside radius.

Rollers or ball bearings are used throughout between the load carrying members, particularly the saddle to the ram and the mounting of the housing on the bed. All loads are transmitted directly up to the center line of the both housings, eliminated distortion from eccentric loads.

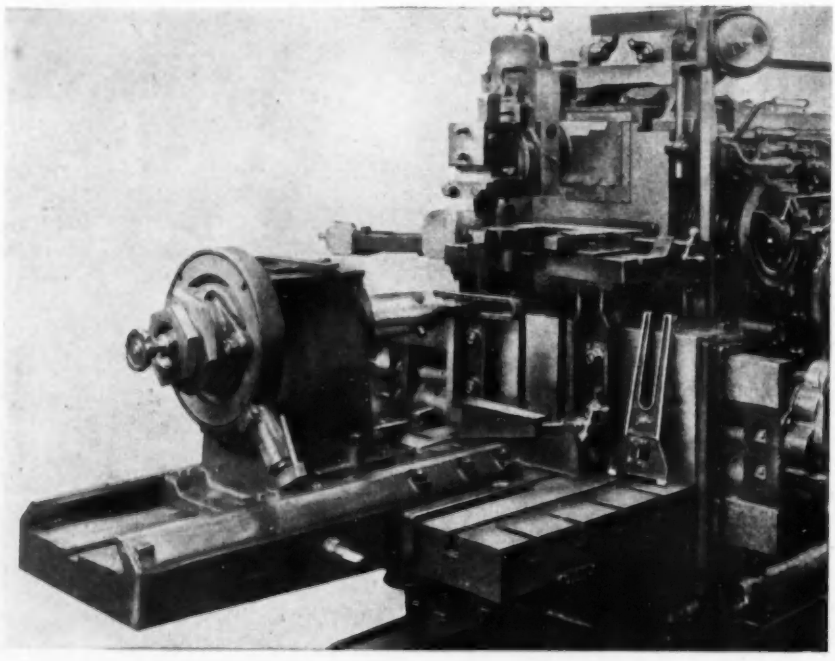
The adjustment to the ram is by motor, the drive being through multiple V-belts to the flywheel. All bearings are either anti-friction or bronze bushed, and the ram guides are gibbed in both directions. Lubrication is fully automatic.

Morton Crosshead Planing Attachment

Applicable to its 38-, 48- and 60-in., high-duty, draw-cut shapers, an attachment designed for all crosshead planing requirements has been placed on the market by the Morton Manufacturing Company, Muskegon Heights, Mich. The base is heavily ribbed and is designed to be bolted to the lower table of the machine. It is relieved on the inside to permit the maximum swing of the largest crosshead.

The headstock is fitted to the slide on the base and provided with a rack and gear for moving it. It thus forms the journals for the arbor on which the crosshead is centered. When the crosshead is mounted on the arbor, it can be rotated to the proper cutting position by means of a worm gear, and can also be unlocked so that the crosshead can be rotated by hand. The headstock is planed and slotted to receive special gages.

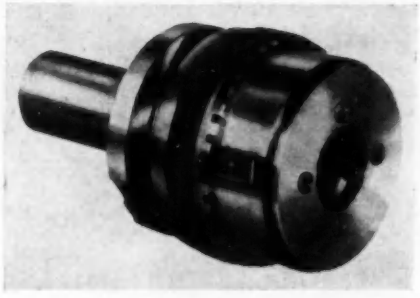
The arbor is closely journalled in the headstock and forms the support for the crosshead. It holds the crosshead central from the tapered piston rod hole, and is designed so that it is self adjusting. The two self-adjusting mandrels furnished take in the entire range of sizes and tapers. A special back bearing is bolted to the saddle of the machine, and is readily adjustable, both horizontally and vertically. It transfers the cutting strains to the column of the machine. The crosshead is set for planing parallel with the center line of the crosshead pin hole by means of a taper leveling attachment.



Morton Crosshead Planing Attachment, which is applicable to the Morton 38-, 48-, and 60-in., high-duty, draw-cut shapers

Rickert-Shafer Model "C" Automatic Self-Opening Diehead

No screw driver, wrench, or other device is required for changing chasers in the model "C" revolving-type diehead announced by the Rickert-Shafer Company, Erie, Pa. The body and shank of the tool are of one piece, which insures concentricity. A tongue and groove joint is employed to hold the chasers against the chaser retainer, thus insuring positive threading action at all times. The chaser retainer is made in two pieces to allow accurate grinding of angular surfaces. By means of the deep notches on the adjusting ring and the sturdy pawl recessed into the chaser retainer, these two members are positively locked.



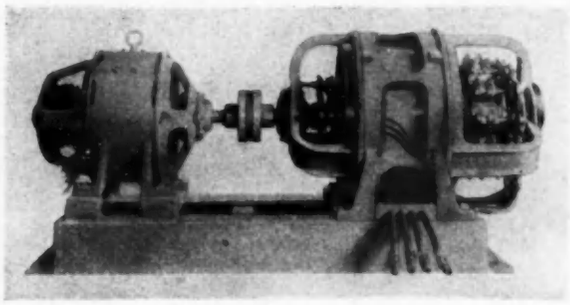
A tongue and groove joint is employed in Rickert-Shafer Model "C" Revolving, Self-Opening Diehead to hold the chasers against the chaser retainer

The model "C" diehead is locked in threading position by two trip dogs located diametrically opposite each other. This prevents cramping. The chasers can be removed and replaced by lifting the latch with the thumb or index finger, causing the trip ring to spring back and carry with it the chaser retainer. The chasers are then free to be withdrawn from the slots.

The model "C" diehead is made in the following sizes: $\frac{5}{16}$, $\frac{7}{16}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, and $1\frac{1}{2}$ in. These sizes, respectively, give the following ranges: $\frac{1}{16}$-$\frac{5}{16}$; $\frac{1}{8}$-$\frac{9}{16}$; $\frac{1}{4}$-$\frac{3}{4}$; $\frac{3}{8}$-1; $\frac{1}{2}$-$1\frac{1}{2}$; $\frac{5}{8}$-$1\frac{1}{2}$ inches. The first size will not cut standard pipe threads, but all the others will within their capacity. Morse taper shanks are provided, and four chasers are used for all sizes of dieheads.

Reliance Frequency Converters

Frequency converters for obtaining frequencies different from those furnished by the power company are available through the Reliance Electric & Engineering Company, 1042-1090 Ivanhoe Road, Cleveland, Ohio. These



Reliance Frequency Converter, which is built in a wide range of sizes to obtain frequencies other than those available on power lines

machines are built for operation on either two-phase or three-phase current. They provide an economical method of obtaining single-phase, two-phase or three-phase current at any low frequency, and they are made specially for obtaining very low frequencies, such as three to fifteen cycles. These converters have been used to obtain variations in speed with squirrel-cage induction motors, and to get speeds which are either higher or lower than can be obtained from induction motors operating on a standard frequency.

"A-S-E" All-Steel Tool Cabinets

The problem of storing and safeguarding drills, reamers, and other small, expensive tools is a source of trouble when tools are stored outside of a toolroom. To meet the need of safe storage of such tools, all-steel storage cabinets have been announced by the All-Steel-Equip Company, Aurora, Illinois.

Small tools such as reamers, drills, and cutters can be stored safely in this "A-S-E" All-Steel Tool Cabinet

Each of the four types offered have steel angle and channel frames, with substantial body members to sustain heavy weights. Standard equipment includes six sloping shelves with five adjustable partitions in each, and one horizontal shelf near the bottom. All tools are in plain sight. Compartments can be labeled to eliminate time lost in unnecessary searching. All shelves in these cabinets are adjustable.

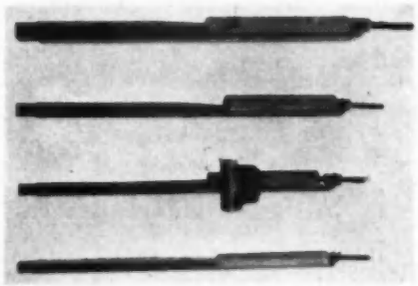
Where tools are stored outside the toolroom, the model with locking ing doors is especially useful. The doors are panel re-inforced with a three-point latching device, and have vault type handles and a Yale lock. The cabinets are finished in baked green enamel.

Huff Expansion Reamer

Adjustment through very small increments is the feature of the square reamer placed on the market by the Huff Machine Works, 44 Exchange St., Milford, Mass. From the accompanying illustration, it will be seen that the wooden guide shoe is movable along the taper side of the reamer, this movement being effected by loosening the outside nut on the stud and turning the inside one against the reamer tip. Since the taper groove in the guide shoe mates with the taper on the reamer, the expansion is equal throughout the reaming length, and the adjustable guide remains parallel with the cutting edges. A stud fixed in the shoe and passing loosely through the reamer tip holds the shoe in place. No wrenches are required for setting the shoe, the thumb and forefinger sufficing, thus saving time and annoyance.

Although this reamer is particularly adapted for scraping bearings to get nearly 100 per cent bearing over the entire area, it is also suitable for taking heavier cuts. Furthermore, it can be sharpened easily by the average mechanic.

Each guide shoe provided has an adjustment of $\frac{1}{32}$ in., and several of them are provided with each reamer. In all there are nine different reamers

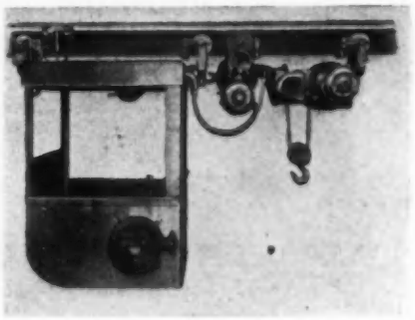


Huff Expansion Reamers designated as *D*, *E*, *F* and *G*, which are put up specially in a steel box for automotive work. The range is from $\frac{7}{8}$ to $1\frac{1}{8}$ inches

available, ranging from the one designated as *A* to the one known as *I*, inclusive. Each of these reamers is supplied with five adjustable guide shoes, except the last two, which have nine. Each guide shoe is marked distinctly with the size and letter corresponding to the reamer on which it belongs. The first size *A* has an expansion of $\frac{5}{16}$ to $\frac{3}{8}$ in., and the last size *I* from $1\frac{7}{16}$ and $1\frac{11}{16}$ inches. Sets are available in steel boxes.

Louden Motor-Driven Trolley

Handling from raw material to finished product, particularly in straight line manufacture, is the function of the motor-driven trolley announced by the Louden Machinery



Hook capacity of 4,000 lb. is provided in the Louden Motor-Driven Trolley

Company, Fairfield, Iowa. Rope, push-button, romote, or dispatch controls are available, permitting the trolley to be operated in the best manner for particular application. The cab is inclosed or open or furnished with a step-on platform, when the operator must dismount frequently. All gears are inclosed, and moving parts that do not run in oil are reached by high-pressure lubrication of the Alemite type. All rotating parts, including the motor, run on ball bearings. Capacity is up to 4,000 pounds.

Rivett Integral Slide-Rest Grinder

Internal and external grinding operations, face grinding, and grinding between centers can be handled on Rivett bench lathes by the addition of an integral, motor-driven slide-rest grinder. This attachment has been placed on the market by the Rivett Lathe & Grinder Corporation, Brighton, Boston, Mass. The grinder may be mounted in either the Rivett eccentric-type toolholder or the conventional rocker toolpost, and the compound slide-rest affords convenient setting at any angle to permit cross, longitudinal, or angular feeds of the grinding wheel. The grinding atttachment is furnished with either a round shank for an eccentric toolholder or square shank for the conventional rocker toolpost.

The illustration shows the grinder with an internal wheel mounted on the arbor and the slide rest set for straight grinding of a hole. The switch seen at the right of the illustration permits convenient starting and stopping of the attachment. As the compound slide rest affords convenient setting for either straight or tapered work and permits of cross or longitudinal feeds of the grinding wheel, a variety of operations can be quickly and accurately performed.

In Fig. 2 is shown the horizontal safety drive ball bearing countershaft mounted in the cabinet of the Rivett bench lathe.

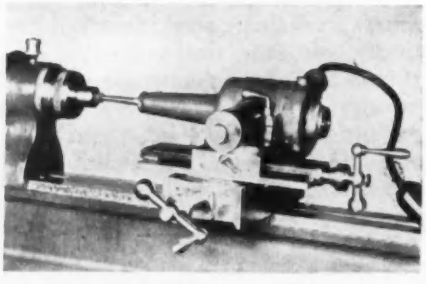


Fig. 1—Rivett Integral Motor Slide-Rest Grinder

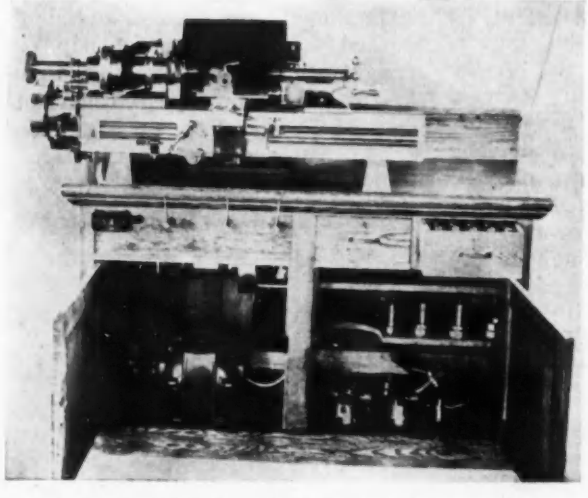
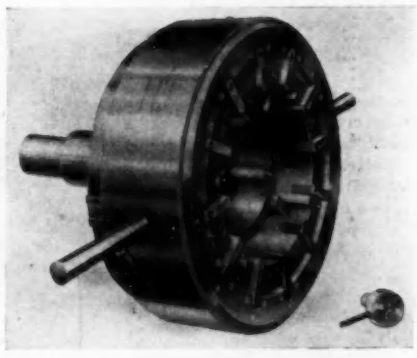


Fig. 2—Rivett Horizontal, Safety-Drive, Ball Bearing Countershaft mounted in the cabinet of a Rivett Lathe

Modern 14-Inch Self-Opening Diehead

Capacity for cutting threads from 10 to 14¼ in. in diameter is built into the stationary-type, self-opening diehead illustrated. This tool has been built by the Modern Tool Works Division of the Consolidated Machine Tool Corporation of America, Rochester, N. Y. It is claimed to be the largest diehead ever made for turret lathes, the outside diameter being 21½ in., and the length, less the shank, 8½ in. Its size in comparison with the standard ½-in. diehead is shown in the accompanying illustration.

The above wide range of thread cutting capacity is obtained by the use of a chaser holding ring for the smaller threads. This ring is fitted into the bore of the diehead. Chaser slots in the ring and diehead are ground together, and the use of this ring gives added support to the chasers when cutting small diameters.



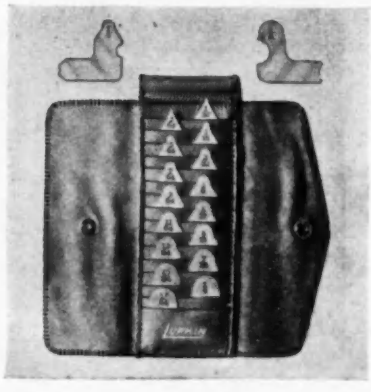
Modern 14-Inch Self-Opening Diehead shown in comparison with a ½ in. diehead of the same make

It is claimed that in spite of its size, this diehead operates positively and easily because the cam ring is mounted on two sets of roller bearings, one in the front and one in the rear. Each chaser, of which there are 12 to a set, is held in its slide by one screw and can be readily removed. The chaser slides, in turn, are cammed to the large cam ring, so that at the point of opening, each chaser is pulled positively out of the cut.

There are four points to lock the die in its closed position. Adjustment for size is simple and the changing of size is prevented by means of a special device. The die is arranged with an internal trip, which is adjustable for the length of the thread to be cut. Every part of the die is hardened and ground.

Lufkin Radius Gages

Additional radius gage sets have been added to the line manufactured by the Lufkin Rule Company, Sagi-



Lufkin Improved Radius Gages, which are now available up to ½ in. radii

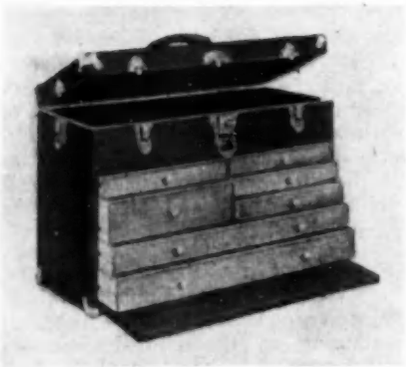
naw, Mich. These radius gages are now available up to ½ in. radius. The additional gages are from $\frac{9}{32}$ to ½ in. radius by 32nds.

Each gage is a separate unit. This permits it to be conveniently and accurately applied to the work, and the internal and external forms are on the same piece.

The gages are regularly furnished insets in leatherette folders in the following combinations: No. 77A, 16 gages from $\frac{1}{32}$ to $\frac{17}{64}$ in. by 64ths; No. 77B, 8 gages from $\frac{9}{32}$ to ½ in. by 32nds; No. 77C, 24 gages from $\frac{1}{32}$ to $\frac{17}{64}$ in. by 64ths, and $\frac{9}{32}$ to ½ in. by 32nds, and 77D, 16 gages from $\frac{1}{32}$ to ½ in. by 32nds.

Baker-Case Machinists' Chests

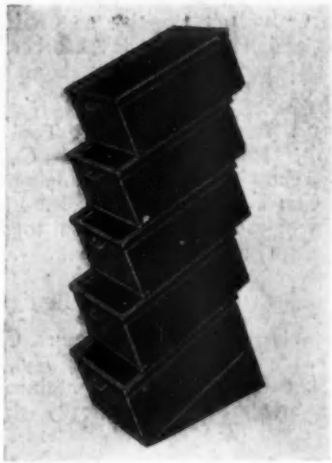
Four models of machinists' chests, two each in the 17 and 20 in. sizes, have been placed on the market by the Baker-Case Manufacturing Company, Inc., Racine, Wis. Among the features are: steel drawer runners, lock corner and glued construction, hand fitted drawers, leather handles with steel reinforcement, riveted, nickel-plated drawer pulls, steel, felt-lined drawer bottoms, and nickel plated hardware.



Baker-Case Machinists' Chest

"A-S-E" Stacking Boxes

A simple but effective arrangement for stacking boxes, that saves shop space and materially reduces costs and handling operations, has been worked out by the All-Steel-Equip Company, Aurora, Ill. Stacking boxes as shown are stacked on a slant base, and a spacer placed on the stacking rim on the front of each box permits easy access to each container. The space can be made to accommodate the size of the part stored. Since the stacking boxes rest at an angle, parts will roll to the front automatically so that the stock on hand is always seen at a glance.



"A-S-E" Stacking Boxes which cause supplies on hand to be always visible

Gerstner No. 42 Tool Chest

A larger variety and a somewhat different arrangement of drawers are found in the No. 42 tool chest announced by H. Gerstner & Sons, 178 Columbia St., Dayton, Ohio. The chest is designed particularly for machinists and toolmakers requiring a large choice of drawer sizes. The chest has three full length drawers, 18¼ in. long inside, and seven drawers 7⅛ in. long inside. There is also an upright center drawer designed to receive the *American Machinists' Handbook*, or a drill block, and there is a roomy top compartment.

This chest is fitted with a front lid which slides on steel bearings under the bottom drawer. The lid also swings upward and locks automatically when the top lid is down.

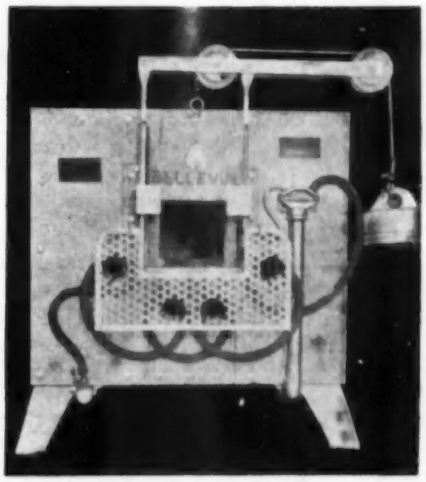
The chest is finished either in an imitation black seal grain leather with hand tooled designs, or polished, quartered oak.

A large variety of drawer sizes is found in the Gerstner No. 42 Tool Chest

Bellevue Toolroom Furnace for Brazing Tungsten-Carbide Bits

Brazing of tools, particularly tungsten-carbide bits, can be done in the furnace illustrated, which has been placed on the market by the Bellevue Industrial Furnace Company, 2971 Bellevue Ave., Detriot, Mich. Since it is an electric furnace, turbulent gases are eliminated in the interior and the borax employed for brazing remains on the tools, so that the refractories are not endangered. A series of "Globar" heating elements are used in the furnace, which is provided with a sillimanite hearth.

The typical unit, shown, type "LSU," has an effective hearth 6 in.

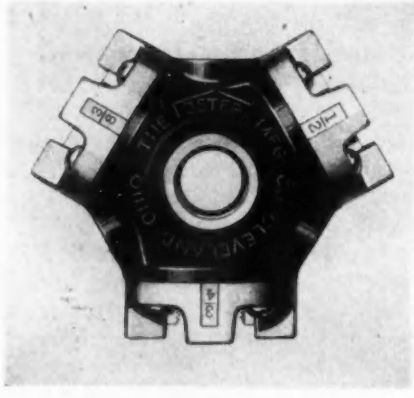


Tools and tungsten-carbide bits may be brazed in Bellevue Type "LSU" High-Temperature Toolroom Furnace

wide x 12 in. deep and a connected load of 14 kw. It gives a maximum temperature of 2,450 deg. F. Bench type and floor type units are available and can be furnished with an atmospheric control.

Oster Three-Way Pipe Threader

A three-way threader for ⅜-, ½- and ¾-in. pipe that will put a standard length thread on a pipe close to a machine frame or wall, has been announced by the Oster Manufacturing Company, Cleveland, Ohio. This threader, called the No. 000 "Chip Chaser," uses the same open type die holders as the regular "Chip Chasers," allowing a large area for oiling and chip clearance. The tool is balanced and cuts a perfect thread in any one of the three sizes. It is small and light in weight and is equipped with a large size handle.



Oster Three-Way Pipe Threading Tool for ⅜-, ½-, and ¾-in. pipe

TRADE PUBLICATIONS

AIR-OPERATED DEVICES. The Logansport Machine Co., Logansport, Ind., has issued Catalog S-25 showing its complete line of air-operated devices adaptable to all types of production machines. These include chucks, double-acting cylinders, work ejectors, and other items. The catalog contains 64, 8½ x 11-in. pages.

AJAX ANNIVERSARY CATALOG. The Ajax Metal Co., Philadelphia, Pa., has issued an attractive booklet tracing the growth of the company from its inception in 1880 until the present time. The company's accomplishments are summarized concisely, and a list of the present officers is included.

BELTING, LEATHER. The Philadelphia Belting Co., 6th & Spring Garden Sts., Philadelphia, Pa., has issued a publication on leather belting entitled "The Only Belt Positive as Chains or Gears and Also a Shock Absorber." It consists mainly of testimonials and pictures of diversified applications.

DRILL JIGS. The Siewek Tool Co., Detroit, Mich., has issued Catalog No. 3, showing its rapid clamping drill jigs, cam locks, and drillheads. Photographs of each item are given, together with drawings and specifications. Of particular value is a list of parts that can be tooled up on these drill jigs.

ELECTRIC TOOLS. The James Clark, Jr., Electric Co., Louisville, Ky., has published Catalog No. 32 containing 96 pages on "Clark" electrically driven tools, appliances and attachments.

LATHE HANDBOOK. The South Bend Lathe Works, 330 East Madison St., South Bend, Ind., has published "South Bend Handbook No. 33 for the Auto Mechanic." Many pictures throughout illustrate the use of New Model lathes and the various attachments are described.

GENERAL MOTORS STANDARDS SHEETS. The General Motors Corporation, Flint, Mich., has published Standard Sheets to be inserted in Vol. I of its standards. These standard sheets are approved as of May, 1930.

GRINDING WHEELS AND MACHINES. The Norton Co., Worcester, Mass., has published a booklet "The Product With a Background," showing grinding wheels of many different types, abrasives, grinding machines, and flooring materials.

LUFKIN TOOLS. The Lufkin Rule Co., Small Tool Division, Saginaw, Mich., has issued Catalog No. 6, describing its mechanical tools, measuring tapes, rules, and miscellaneous products. The catalog contains 112, 7½ x 5-in. pages.

MORSE CATALOG. The Morse Twist Drill & Machine Co., New Bedford, Mass., has published a pocket edition of its catalog on high speed and carbon drills, reamers, cutters, taps, dies, and other tools. Its handy size permits its being carried around for ready reference.

MOTORS. The Reliance Electric & Engineering Co., Ivanhoe Road, Cleveland, Ohio, has published Bulletin 108 on the Type AA, Form L, across-the-line motors with ball bearings for two- and three-phase, a.c. circuits. A table of ratings is included.

THERMAL ANALYSERS AND DIFFERENTIAL DILATOMETERS. The R. F. Ferner Co., Investment Building, Washington, D. C., has published Catalog No. D-1 on Chevenard industrial thermal analysers and differential dilatometers for thermal studies of steels, alloys, and other products.

TOOLS. The Apex Machine Co., Dayton, Ohio, has published a catalog on production tools, such as quick-change drill and tap chucks, floating tool holders, stud and nut setters, and universal joints. Illustrations, descriptions, and complete specifications are given.

TRUCKS, INDUSTRIAL. The Saginaw Stamping & Tool Co., Saginaw, Mich., has issued its 1930 catalog on industrial trucks, casters, and other equipment. It is known as No. 30-CT and gives illustrations and descriptions of each article offered.

CO-OPERATIVE ENGINEERING COURSES. The General Motors Institute of Technology, Flint, Mich., has issued its bulletin for 1930-31 on the co-operative engineering courses given to employees of the corporation.

INDUSTRIAL ACCIDENT STATISTICS, 1930 EDITION. The National Safety Council, Civic Opera Building, Chicago, Ill., has published a booklet "Industrial Accident Statistics," 1930 edition, throwing new light on the accident problem as it relates to a large part of industry, although not to the whole, and gives a summary for all industries and then follows with accidents in 27 specific industries, and also those in various others.

PROTECTION OF PRESS OPERATORS. The World Peace Foundation, 40 Mount Vernon St., Boston, Mass., is distributing in the United States a booklet entitled "Protection of Workers Operating Metal-Working Presses" as published by the International Labor Office of the League of Nations, Geneva, Switzerland.

SAFETY COMPETITION. The Metropolitan Life Insurance Co., Policyholders Service Bureau, 1 Madison Ave., New York, N. Y., has issued the seventh of a series of reports on industrial safety, entitled "Safety Competition." It presents methods of planning and organizing inter-departmental contests which will serve as incentives for safe workmanship.

STATISTICS OF THE AUTOMOTIVE INDUSTRY. The National Automobile Chamber of Commerce, Marlin-Rockwell Bldg., 366 Madison Ave. at 46th St., New York, N. Y., has published "Facts and Figures of the Automobile Industry," 1930 edition.

NEWS
OF THE WEEK

Machine Tool Builders Are Told Large Plants Can Stabilize Employment

QUOTING from an analysis of the 1927 census of manufactures, General Manager DuBrul, of the National Machine Tool Builders' Association, explained to a record gathering of members and guests, at Columbus, Ohio, on May 19, that 68 per cent of the volume of manufactures in the United States is produced in 10,000 of the 250,000 plants. These plants employ 58 per cent of the workers. Because of the concentration of plants and workers in a few industrial centers, the managers of these large plants have a heavy responsibility in keeping them occupied in slack times and thus stabilizing employment. What the managers of the remaining smaller plants do is relatively less important.

"Our industry," continued Mr. DuBrul, "is much interested in this problem of general stabilization, because we cannot stabilize our production unless our customers stabilize their demand for machine tools. Although we are a small part of the total industry of the country relative to our size, we suffer more irregularity than any other industry.

"For 10 years our average demand was only 160 on our scale, but we had to provide plant facilities and men to turn out 330 scale units in March, 1929, when orders were at a peak. We naturally have much more capital invested in plant than we would need if we could go along on the average basis of 160. Our peak load capacity is more than twice our average demand. In a boom we build up a force to the peak load capacity to take care of our customers' orders for a short period. Then we have to lay off many of these men when our demand falls off. We don't like this situation. It is very troublesome and very costly to have such irregular operation in an industry requiring the kind of skilled labor that we require. About the only thing that we can do is to keep calling this situation to the attention of our customers, to urge them to do their replacing of old equipment in times of dullness rather than in times of boom. But it will be quite a long time before all the larger units of our industry's customers are educated up to this point."

The 28th spring convention was opened by President C. A. Johnson, Gisholt Machine Company, with a statement congratulating the association on its high position among trade associations. Mr. Johnson expressed the hope that the association might be helpful to other associations in the working out of their problems. He also commented on the opportunity for co-operation within the membership through replacement of obsolete equipment within the machine tool plants.

Carl A. Johnson
Mr. Johnson was also recently elected a director of the National Chamber of Commerce

A report on the present status of time selling in the machine tool industry, presented by George T. Aitken, National Acme Company, was to the effect that activity in this direction is promoted by finance companies rather than by sellers or buyers. He expressed the belief that time sales were of relatively more importance to dealers selling to small users.

For the committee on standard proposal form W. W. Tangeman, Cincinnati Milling Machine Company, presented a recommended draft, which was discussed rather freely. In amended form the draft was approved and ordered bulletined to the members as a standard form recommended for their individual adoption.

The chairman of the exposition committee, R. E. Flanders, Jones & Lamson Machine Company, reported that plans were under way to extend the period of the 1932 show so that it would extend from Saturday morning of one week until Saturday night of the following week. The first Saturday would give the exhibitors an opportunity to visit other exhibits, a privilege that was denied most of them in 1929.

Messrs. Burleigh, Sundstrand Machine Tool Company; Eberhardt, Gould & Eberhardt; and Gray, Landis Tool Company, gave their impressions of the exhibits of German machine tools at the recent Leipsic Fair. They were unanimous in recognition of the great strides made by the Germans in the last two years and warned their hearers that German competition is now a factor to be reckoned with. They were impressed by the attractiveness of appearance of the machines and especially with the motor mountings. They also commented on the wide use of built-in meters and gages, and of hydraulic feed controls.

On the adverse side they reported objection on the part of exhibitors to the frequency of the exhibits, and an apparent failure to realize the importance of actual demonstration of machines under full load.

Mr. Flanders, at the request of the board of directors, led a discussion on the definition of a machine tool. The reason for seeking such a definition lies in the need for a standard by which to determine the eligibility of applicants for membership in the association.

Mr. Flanders pointed out that as an association grows it becomes less a group of people meeting to discuss mutual problems, and more an impersonal organization.

Two definitions, one more and one less restrictive, seemed to find favor. The broader one is: A machine tool is a power-driven metal-working tool whose principal use is the production of parts of machinery.

The narrower definition reads: A machine tool is a power-driven tool not portable by hand, for the cutting of metal.

The board of directors has the matter under consideration.

SPEAKING of the state of business, Mr. DuBrul, had this to say:

"Since we last met in October we have experienced another of the swift and drastic changes in demand that are characteristic of the Machine Tool Industry. As shown by our Index of Orders for the first quarter of 1929 our orders averaged 321 on our scale, and for the first quarter of 1930 they averaged only 181.

"This means that for the first quarter of this year the orders ran only about 56 per cent of the volume of business placed in the same period of 1929. Such are the buying habits of the customers whom we serve.

"After seven years of dull business succeeding the post war boom, last year we got just a little bit above the level of 1919 in dollars. But the productivity of the machine tools sold in 1929 was far greater than the productivity of those sold in 1919. Newer designs must be productive in order to get a market, but selling this increasing productivity continually narrows our market.

"It is always interesting to guess at what business is likely to be. We need not guess as blindly now as we had to guess ten years ago. Our statistical studies show that the industry has run quite definitely on three year cycles with only two exceptions since 1901. It gets two years up with the third year generally less than either of the preceding two years, so that this year's business will probably be less than that of the last two years. The monthly statistics also show that the bottoms of all these depressions have come in the summer months, and that business was better in the fall than in summer in dull years.

"How good it will be this fall remains to be seen. We must remember that in recent years a good part of our total demand came from the expansion of the automobile industry. That demand of course is off this year. But on the other hand a still larger part of 1929 business was placed by other industries that were modernizing their plants. Present activity of inquiry reported shows that there is much more of such business pending. It seems probable that as soon as business confidence takes a turn there will be marked revival in orders for such equipment, and that our industry will be doing pretty well again during the last quarter of this year. It might easily turn out that the total orders placed for the whole year will be better than in any recent year except the last two."

* * *

A.S.S.T. Chapters Hold Joint Meeting

The New York, New Jersey, Philadelphia, and Lehigh Valley chapter of the American Society for Steel Treating held their second annual meeting in Newark, N. J., on May 23, with the

Robert Guthrie

first two chapters acting as hosts. During the morning the members of the four chapters visited the plant of the Western Electric Co., Kearny, N. J., and spent the afternoon in the plant of the Wright Aeronautical Corporation, Paterson, N. J. Honored guests for the event were R. G. Guthrie and W. H. Eisenman, national president and secretary, respectively, of the Society.

A.S.T.M. Announces Program for Thirty-Third Annual Meeting

A PROVISIONAL program for the thirty-third annual meeting of the American Society for Testing Materials, to be held at Chalfonte-Haddon Hall, Atlantic City, N. J., was recently announced by the Society. It contains even more than the usual number of papers and reports. To provide for their presentation sixteen sessions are contemplated, including six pairs of simultaneous sessions. The metals, as is customary, will be covered at sessions on each day of the meeting.

At the opening session, to be held on Tuesday afternoon, June 24, following a day taken up by registration and committee meetings, reports will be presented of the administrative committees, followed in turn by reports and papers dealing with research methods of testing. The second and third sessions will be held in the evening. Topics at the second session will be wrought iron, cast iron, magnetics, and metals at high temperatures.

The program Wednesday morning begins with a fourth session on steel, together with a fifth session on a variety of non-metallic materials and products. The Edgar Marburg lecture and the Charles B. Dudley Medal Award will be a part of the sixth session on Wednesday afternoon. The seventh session will include the presidential address and the presentation of new officers, together with a part of the executive committee. An informal dance and smoker will be held on Wednesday evening.

Fatigue and corrosion of metals will constitute the eighth session on Thursday morning, while the ninth session, occurring simultaneously, will take up brick, refractories, stone, timber, and similar materials. The afternoon will be taken up by committee meetings and various sport tournaments. The tenth session, on non-ferrous metals, will be held on Thursday evening, simultaneously with the eleventh session.

A symposium on aircraft materials will constitute the thirteenth session on Friday morning, simultaneously with the twelfth session. The fourteenth session, a continuation of the symposium on aircraft materials, will be held on Friday afternoon, simultaneously with a fifteenth session. The official program closes that evening.

* * *

Gage Standards Recommended by A.S.A.

The establishment of national standards for pressure and vacuum gages was recommended at a general conference held in New York City on May 15, under the auspices of the American Standards Association. Thirty-five representatives of manufacturers and users of pressure and vacuum gages and of technical governmental and safety bodies having an interest in such gages were present at the conference. The conference favored, in general, the development of specifications which would tend to unify the external features of gages of the indicating types, and permit a reasonable amount of interchangeability between the various makes.

* * *

Hof Succeeds Williams As Chief of Ordnance

BY OUR WASHINGTON CORRESPONDENT

Brig. Gen. Samuel Hof was nominated on May 21 as Chief of Ordnance with the rank of major general for a term of four years. The present chief of the ordnance department's field service succeeds Maj. Gen. C. C. Williams, who retired from active service on April 1.

The appointment of General Hof was endorsed by Secretary of War Hurley and by General Williams. General Hof was the senior candidate for appointment who was still eligible under the retirement law, but the representatives of industry who have co-operated with General Williams in carrying forward the program of industrial preparedness were hopeful that Brig. Gen. C. L'H. Ruggles would receive the appointment. Gen. Ruggles has been active in prosecuting this program.

* * *

Canning Machinery Makers Announce Meeting Dates

The 1931 annual convention of the National Canners and Allied Associations will be held in Chicago, during the week beginning Jan. 19, with Hotel Stevens as convention headquarters. In connection with that meeting, the annual meeting of the Canning Machinery & Supplies Association will be held. Information regarding the events of the meeting or reservations may be gotten from John A. Hanna, Cadiz, Ohio.

S.A.E. Summer Meeting Well Attended

French Lick, Ind., May 27—A large and well-attended S.A.E. Summer meeting is in progress here. Exhibits of early automotive vehicles and engines help to make apparent the great advances in design effected during the society's 25-year life. The Silver Anniversary celebration is proving stimulating and instructive.

Vincent Bendix, president of the

Vincent Bendix

Bendix Aviation Corporation, is revealed as the nominee for president of the Society in 1931. The annual election takes place late this year, but since there never has been a second ticket in the field, nomination is tantamount to election. Other nominations include: vice-president, each of whom represents the "professional activity" named in parenthesis after the name, as follows: George W. Lewis (aircraft engineering), Arthur Nutt (aircraft-engine engineering), John A. C. Warner (passenger car engineering), Carl B. Parsons (passenger-car body engineering); C. W. Spicer, treasurer; Frederick S. Duesenberg, Norman G. Shidle and Charles E. Tilston, councilors to serve two years. The remaining vice-presidential nominees are as yet unsettled, and will be announced on Wednesday or Thursday of this week.

Several reports of divisions of the Standards Committee have been approved for submission to mail vote of the Society. The items involved include pulleys for aircraft, stream line and internal tie-rods, clevis pins, separable (open) and angular contact ball bearings, metric sparkplugs, several new specifications for aluminum alloys, protective coatings for aluminum.

Yesterday's sessions dealt with automobile engines, bodies, and transmissions. Alex Taub of Chevrolet spoke on power plant economics and combustion chamber design, and Bureau of Standards representatives on bearing bronzes with additions of zinc, phosphorus, nickel, and antimony. The evening session was devoted chiefly to discussion of gearsets, with papers by Herbert Chase, associate editor of *American Machinist* and *Product Engineering*, F. C. Pearson, of Reo, and W. R. Griswold, of Packard.

(A further report of the meeting and abstracts of selected papers will appear in later issues of *American Machinist*

* * *

Technical Editors Visit Alco Research Laboratory

Editors of twenty-seven technical and business papers visited the new $1,000,000 research laboratory of the Aluminum Company of America on May 20. They were greeted by officials and technical advisors of the company and shown through the new laboratory where demonstrations were made by the research experts in each division. In the evening the editors were entertained at dinner at the residence of Roy Hunt, president of the company.

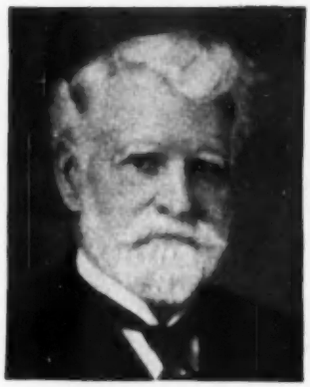
* * * *

The Warner & Swasey Company Celebrates 50 Years

IT IS fifty years since the Warner & Swasey Company began building "master tools of industry," the anniversary being most fittingly celebrated at Cleveland on May 23, when something over 2,000 people were privileged to gather and do honor to Ambrose Swasey, the surviving member of the firm. Mr. Warner passed away less than a year ago. After an appropriate welcome by Pres. Philip E. Bliss, Mr. Swasey spoke briefly but feelingly of his 63-year friendship with Mr. Warner, of the founding and growth of the business, the changes in the machine tool industry, and the able way in which the business was being carried on by his younger associates.

The address of the occasion was delivered by Dean Dexter S. Kimball of the College of Engineering, Cornell University, who, as always, left a deep impression on his hearers. He pointed out the effect of machine tools on civilization, how the coming of the lathe and other machines had made it possible to produce enough to have more necessities for general distribution. When handcraft prevailed, the workers received only a bare subsistence, the bulk of what they produced going to their rulers. The advent of the machine has so increased production that the worker now has comforts unknown to kings. And while recognizing that there are still dark spots in industry to be eliminate, Dean Kimball gave indisputable evidence of the great improvement in conditions over anything the world has ever known. Education for the masses and the great strides toward the elimination of disease are but two factors that point out our bettered conditions.

Following a custom of long standing, Mr. Swasey presented gold watches, which he aptly termed "animated medals" to six men who had completed 25 years of service with the company. This was followed by awards of prizes to 13 apprentices, those in their last year being given trips to visit some of



Ambrose Swasey

the leading plants of the country. This has also been one of the company practices for some years.

Every graduate apprentice who was present wore a suitable identification card, and it was of striking interest to note the number of men now prominent in the industry, who were formerly apprentices in the Warner & Swasey shop. As was pointed out by Mr. Bliss and by Dean Kimball, the Warner & Swasey Company had not only built good machines but good men as well, both being great assets, not only to the industry but to the country.

In addition to employees, ex-employees, and their families, many men well known in the industry, were in the audience, some of them coming from long distances to do honor to Mr. Swasey and to the institution which he founded 50 years ago. It is difficult to imagine a more genuine expression of enthusiasm or a more fitting tribute to a veteran tool builder. Following the exercises, Mr. Swasey held an informal reception, after which the plant was thrown open to inspection, supper was served, and dancing begun.

* * *

AMONG the executives who will address the National Association of Purchasing Agents during their convention in Chicago, from June 16 to June 19, are: Alvan T. Simonds, president, Simonds Saw & Steel Company; W. W. MacMillen, chairman of the National Committee on Iron and Steel and purchasing agent of the National Malleable & Steel Castings Co.; B. F. Fairless, president, the Alloy Steel Company; John Whitehead, purchasing agent, Fairbanks, Morse & Co., and president of the association.

BUSINESS · BAROMETER

The future of business for the year depends principally upon the stabilization of agricultural values

By THEODORE H. PRICE
Editor, Commerce and Finance, New York

WHILE it cannot be said that President Hoover's faith cure was a complete success in averting a business depression, it must be admitted that its effect has been encouraging and that its constructive influence is commencing to be evident.

This is particularly true of the building industry where the work contracted for or commenced during the month of April appears to have been encouragingly large, and it is likely to increase still further in the near future.

Distributive trade in merchandise is, however, still running under that of last year. The shrinkage in both volume and value is generally attributed to the low prices at which many of the great staples are selling. According to the National Fertilizer Association, commodity prices declined five-tenths of one per cent during the week ended May 17, and while this does not amount to much in money, it is accepted as indicating that the trend of values has not yet turned definitely upward. There are, however, signs that such a change in tendency is not far off, and the demand that is uncovered whenever the markets show stability is impressive.

This has been conspicuously the case with copper. Sugar has also commenced to hold up its head in the face of bearish statistics, and cotton and grain look like doing better just as soon as the public becomes convinced that the Farm Board intends to stand by its guns in the campaign of price stabilization to which it appears to have committed itself.

This is particularly true of cotton and cotton goods. The premium for new crop deliveries at which May and July have been sustained has attracted much of the unspun cotton in the United States away from the mills and into the Southern markets.

Wool and woolen fabrics are in better demand, and the low price at which silk is selling is naturally not interfering with the distribution at retail of attractively styled silk fabrics for summer wear.

The low price is the only definite evidence that silk is near bottom, as the statistics give little encouragement to bullish hopes. But conservative merchants who begin to cover forward needs at these levels will probably not regret it. The same is to be said of sugar and rubber, which are at record lows. Cocoa, another of the particularly low commodities, already has bounced back a little. Coffee is one of the few staples on which continued bearish views seem justified.

Not much change is discernible in the industries. The automobile factories have probably reached the peak of their seasonal expansion, which has been moderate. Steel mill activity is slightly smaller. But the tire industry is likely to make further gains during the summer, for though people are buying fewer new cars they are using the old ones more than ever.

The financial situation is, in the main, encouraging. Money grows easier day by day, and for the next six months an abundance of capital seems assured. The supply of credit is in fact so large that it is having a pronounced effect upon the temper of the stock market. The result has been a slight advance in the price of bonds and a stabilization of seasoned and representative stocks. The long interest in the market is fairly large, but it cannot be regarded as excessive, and steadiness is expected until the speculative spirit that is now dormant revives.

Mussolini's bellicosity as manifest in his speech at Florence, a revival of war activity in China, and the non-violent resistance movement that Gandhi is trying to lead in India are the only clouds that overhang the financial horizon abroad. None of them is very serious, and from the newspaper dispatches it would appear that the Gandhi following is losing its enthusiasm for the ideals to which it is pledged.

In the United States the adjournment of Congress appears to come nearer. The passage of the tariff bill is still doubtful, but its enactment seems probable, and may be announced at any moment. For a time it looked as if the Senate might be successful in compelling the inclusion of the debenture plan in the tariff bill, but this now seems to be improbable, and the prospect is that the Farm Board will be undisturbed in carrying out the plans already made.

If the result shall be an equitable stabilization of agricultural values the effect upon business in this country will be electrifying, and it is not too much to say that the future of business in the United States for the year 1930 is very largely dependent upon the fate of the economic adventure in which the Government of this country is now engaged. Its success will be its justification; its failure will cause keen disappointment and much discontent among the farmers who have been fighting so bravely and so long against the fate that confronted them. Patience while we await the issue is urged.

The census reports now being made public disclose a cityward drift of our population that is enormous and alarming, and certain to continue unless some solution for what is called the farm problem can be found.

Copyrighted
Theodore H. Price Publishing Corporation
95 Broad St., New York

From this page the reader will get a quick picture of current business and industry. The boxed material below is a summary of the letters from regional correspondents of the American Machinist, published in full on the opposite page.

LANGUOR, expected to be characteristic of the machinery and machine-tool market for the coming summer, marked it during the past week. Though Canadian and New England markets are showing some life, markets in the remaining tool centers are dull and featureless. The used tool market is fair, and sales can be made easily, providing tools are in good condition. Inquiries are slow, and show little tendency to indicate immediate orders. Because of the vacation, this week-end, dealers expect little activity.

CANADA reports a promising outlook and a resumption of industrial activity which presages business. Chicago shows but few sales, and only one list. Buffalo markets are spotty and dull, having inquiries but nothing more. New England business is stepping up steadily, with good foreign demand and continuing inquiries. Detroit is in the grip of pessimism, for activity is declining and few prospects indicate a revival very soon.

NEW YORK reports a single railroad inquiry and several scattered sales of size. Southern District sales are being made around Houston, Texas, and the general trend is considered to be slightly upward. Indianapolis conditions are poor at the present time, although small tools are being sold in some volume. Cincinnati's market continues its spottiness, though manufacturers there are still busy.

THE INDUSTRIAL REVIEW

Weekly progress of the machinery and machine-tool business

THE following reports, gathered from the various machinery and machine-tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

CANADA

Sales of machinery and machine tools in Canada during the last fortnight have been stimulated by a general improvement in industrial conditions. Engineering projects of magnitude are now in full swing, particularly in hydro-electric development, highway construction, railway extension, and aids to navigation. Road-building machinery is in good demand, and deliveries of contractors' tools, following a period of comparative dullness, are increasingly active. Automobile and allied industries report business slightly better than it was a few weeks ago, but the volume is still below that of last year at this time. Agricultural implement plants are now operating at a higher level.

The outlook for structural steel plants in eastern Canada is very promising. Several thousand tons of structural steel will be required this year in connection with the Montreal terminal project.

CHICAGO

No perceptible change in machine-tool market conditions is reported for the last week. Inquiries, which up to about a month ago were being received in fairly good number, now principally are confined to actual necessities. Buying is on about as low a level as it well can be, and the general situation is such as to find little ground for optimism, at least for the next few weeks. Occasional orders are being received for single tools and small lots, but closing is slow. Railroad inquiry seems to be approaching its final stage for the present, though doubtless new units will be called for from time to time as necessity for them arises. Agricultural machinery and tractor manufacturers are taking little interest in the market at this time, having largely completed their buying for the season. Demand from industrial sources shows little improvement, the only item of any importance reported during the week being a small list of tool requirements sent out by the Cyclone Fence Co., Waukegan, Ill. Used tools are finding few sales, dealers report.

BUFFALO

Machine-tool trade in western New York continues spotty and relatively dull. Most dealers' reports indicate that the expected pickup this month has not developed anything like the business expected. There are many inquiries floating about but few sales are being made. Optimism continues, but there is an occasional dealer who does not look for any business of consequence until autumn.

It looks now as though sales quotas were to be knocked into the well-known cocked hat unless there is some vital change in western New York business conditions in the next two or three months.

One bright spot for the future has appeared in the form of a well-defined but as yet unconfirmed rumor that the Ford Motor Co. has purchased a large factory site with ample Lake Erie deep-water frontage, not for a car making plant but for a huge dismantling and salvaging plant.

NEW ENGLAND

Definite gains have been made and held in the distribution of used machinery. New England dealers generally report a steady step-up in business during the past few weeks; that, while not large, promises to establish a better level of new business. Some distributors passed their April volume of business during the third week of May, and most dealers are more optimistic.

Inquiry for new equipment is being received at a steady rate. This prospective business is the best factor of the situation. Business during the current week showed no marked changes. It would seem that current orders were barely capable of maintaining present working schedules. To the contrary, there has been no further curtailing. This in itself must be taken as an encouraging feature.

It may be pointed out that small-tool sales have been better during May. Foreign demand is encouraging. Lathes, grinders, millers, and small automatics are chiefly representative of the spotty demand. Officials are skeptical regarding any substantial improvement at this time.

DETROIT

The depression in the machinery and machine-tool trade has become more pronounced in the last ten days and the prospect of an early alleviation of the situation seems to be exceedingly slight.

Producers of cheap motor cars are making advances in their production schedules but they are buying little or no equipment. Automobile manufacturers as a whole are averse to making any purchases unless forced to do so by immediate needs. They are using makeshift equipment whenever possible and are postponing the purchase of replacement machinery and machine tools in a manner that is seldom done.

A general atmosphere of pessimism has prevailed here for many weeks and has become increasingly apparent in the past month. Whether this is due to the feeling of insecurity in the automobile trade or to some other basic causes, the result is disadvantageous. Many representative dealers have said that this is the longest and most serious depression they have ever seen. They do not expect an immediate revival and some of them think that the balance of the year will be far below normal.

NEW YORK

Sales of machinery and machine tools in the New York district continue sluggish. There has been very little change during the past week and what little change there has been occurred in the wrong direction. The present week is expected to yield but little business because of the vacation period at its close. Dealers do not expect conditions to change radically before fall. The business from January to June, usually expected to be large enough to carry through July and August among machine-tool dealers, will not do so this year. The reaction is as evident among manufacturers as it is among dealers. One large manufacturer of drills has orders for only 30 to 60 days ahead and considers himself doing well when he is keeping his regular force on the job. The larger buyers of machine tools are showing no interest whatsoever and all buying that is being done is for single units for immediate use. Used tool sales continue fair, when tools of the proper sort can be obtained.

Inquiries in the main are scattered. A new inquiry was received from the New York, New Haven & Hartford Railroad toward the end of the week for a knee-type milling machine arranged for motor drive and a 36-in. rotary head shaper. No other lists of any importance were released nor are any expected in the immediate future.

SOUTHERN DISTRICT

Machinery and machine-tool activity, as has been the case the past few months, continues to center around Houston. Buying in the Monroe oil district has also been satisfactory. While no material change in general business conditions has occurred in the district, the trend in machinery and machine-tool buying during the month of May appears to be slightly upward from April figures.

The first sign of improvement in Florida comes with the announcement that a paper mill be erected at Panama City at an ultimate cost of $10,000,000. The project will be of interest to dealers as far west as New Orleans. Birmingham continues dull, but promising, while points centering about Mobile have offered fair inquiry. Railroads have contributed, in small part, to the gross sales for May.

Deliveries continue satisfactory and prices for both new and used tools are holding firm. Curtailment of sawmill activities throughout the west-south-central area has affected machinery and machine-tool business, while seasonal inactivity of industrial plants may retard, for the present at least, any further improvement in employment.

INDIANAPOLIS

Machinery and machine-tool business continues in the doldrums in this section and from what most of the machinery men say there is little chance now for any improvement of a permanent nature until the fall season. At that, some of the machinery men report sales, but they say so many industries have curtailed their buying to the utmost, and their business does not justify any expansion and only what replacements are absolutely necessary.

The volume of small tools sold to the garage trade this year is about on a par with what it was last year this time. Improvement is noted, however, in sales to airfields, particularly of equipment suitable for the making of ordinary and minor repairs. There has been a fair sale for most lines of second-hand equipment. The dealers here report an increase in inquiries also.

CINCINNATI

In the past week the majority of the machine-tool manufacturers of the Cincinnati district found the market dull and featureless. This caused some disappointment, for during the previous week business had shown a tendency to improve. But it did not cause any great discouragement, the general feeling being that the trade pendulum has reached its low point and is about to begin to swing upward.

The backbone of the week's business was the sale of single tools and replacements, but here and there was an order for two or three pieces of equipment. The business was well distributed over the various sections of the country and the purchases were well diversified as to sizes and types. The principal buyers were general machinists and miscellaneous users, but among the purchasers were concerns in the airplane industry and manufacturers of domestic refrigerating units.

Business Items

The Kinney Iron Works, Los Angeles, Calif., has purchased a tract of land at 49th St., between Santa Fe Ave. and Pacific Boulevard, where construction will be started immediately on the first unit of its new plant. This unit will cover nearly an acre and will be of heavy sawtooth design. The present site of the Kinney Iron Works at 28th St. & Santa Fe Ave. has been sold.

The Alloy Foundry Corporation, New York, has taken a lease on a building at McBride Ave. and Jackson's Lane, West Paterson, N. J., and will operate an aluminum and alloy foundry specializing in aircraft work. H. G. Lamker, former foundry manager of the Wright Aeronautical Corporation, will manage the new plant. C. P. Brown is president.

Geo. Rahmann & Co., 31 Spruce St., New York, recently celebrated their 35th anniversay with a luncheon for all employees.

The Southern Manganese Steel Co., St. Louis, Mo., until recently operated as a subsidiary of the American Manganese Steel Co., Inc., Chicago Heights, Ill., has now become a part of the company and will be operated as the Southern Manganese Steel Division, with an office in the Law & Finance Bldg., Pittsburgh, in charge of W. G. Hoffman.

The Homestead Valve Manufacturing Co., Inc., Coraopolis, Pa., has appointed new distributors for northern Ohio and Milwaukee for the company's water vapor cleansing machine. The two distributors are the M. S. Maleson Co., 606 Rockefeller Bldg., Cleveland, and the Geo. H. Fredricks & Co., 216 W. Water St., Milwaukee, Wisconsin.

Construction of the first unit of its new factory at Richmond, Calif., has been completed by the Rheem Manufacturing Co., which recently bought the Richmond plant of the Republic Steel Package Co. Machinery for the new building is being installed in units so that production, which has been carried on in a portion of the original Republic Steel Package plant, will not be interrupted.

The Chapman Valve Manufacturing Co., Indian Orchard, Mass., has awarded a contract for two additions to its plant, to cost approximately $100,000. An addition 212x75 ft. will be built to the steel foundry and an addition 125x66 ft. to the steel machine shop. Both are one-story structures.

Officials of the Hammond Bolt & Nut Corporation, a Pennsylvania corporation, have filed papers with the secretary of state in Indianapolis enabling the company to transact business in Indiana. The company is formed to be agent for the Pittsburgh Screw & Bolt Corporation. R. P. McDonald of Gary, Ind., is named Indiana agent.

The Lincoln Electric Co., Coit Rd. & Kirby Ave., Cleveland, Ohio, has moved its Baltimore (Md.) distributor's office from 432 to 600 North Calvert St. T. A. Canty is in charge of distribution in the territory. R. Rude is office manager and C. N. Hilbinger is sales engineer and service manager.

The Streine Tool Manufacturing Co., New Bremem, Ohio, has adopted a group life insurance policy for the protection of 65 employees.

Personals

George Lee Miller, former vice-president and general manager of the Gilliam Manufacturing Co., Canton, Ohio, which sold its patents and manufacturing rights on tapered roller bearings to the Timken Roller Bearing Co. five years ago, has been asked by the Soviet Government to establish and operate a roller bearing plant in Moscow. Mr. Miller, under the plan submitted to him by representatives of the Soviet Government, will undertake the assembly of an organization, purchase the required machinery in this country, and go to Moscow by Jan. 1 of next year.

D. W. Ardiana, production manager of the Los Angeles plant of Kay-Brunner Steel Products, Inc., has been appointed general manager of the Alhambra, Calif., plant of the company.

Ervin G. Bailey, president of the Bailey Meter Co., Cleveland, was awarded the Longstreth medal of the Franklin Institute recently in recognition of his many inventions and developments of regulating, controlling, measuring, and recording instruments.

Harold F. Kneen has been appointed plant superintendent of the Lincoln Electric Co., Cleveland. Superintendent Kneen came to the Lincoln company as

assistant plant superintendent in June of last year. Concurrent with the announcement of Mr. Kneen's appointment is the appointment of C. J. Bowers as production manager at the Cleveland plant.

Charles E. Beardsley, director and president of the Beardsley & Wolcott Manufacturing Co., Waterbury, Conn., has resigned and withdrawn from the company. Mr. Beardsley is president of the Bridgeport Brass Co., and will devote his time to that interest. R. W. Reid, Providence, R. I., has been elected vice-president and general manager of the Beardsley & Wolcott Company. He was formerly general manager of the Taft-Peirce Co., Woonsocket, R. I. Emil Mannweiler, vice-president and general manager of the Eastern Malleable Iron Co., Naugatuck, Conn., was elected a director of the Beardsley & Wolcott Company.

Arthur J. Busch, formerly connected with the King Manufacturing Corporation, Buffalo, has resigned to become manager of the E. R. Caldwell Co., Bradford, Pennsylvania.

J. Frank Davidson, formerly assistant general manager of the Jeffrey Manufacturing Co., Columbus, Ohio, was elected vice-president and assistant general manager on May 7. He has been with the company since 1911 and is also a director of the Ohio Malleable Iron Company.

Charles V. Franklyn, associated for 20 years past with the Colonial Steel Co., Monaca, Pa., has resigned to accept a position with the Braeburn (Pa.) Alloy Steel Corporation, as St. Louis district sales manager.

C. N. Galer, formerly assistant sales manager for the Studebaker Corporation of Canada, has been appointed general sales manager of Studebaker's Canadian division.

Russell F. Hamilton, for the past five years research engineer and assistant foundry foreman, Michigan Steel Casting Co., Detroit, has become associated with the Jones & Laughlin Steel Co., Pittsburgh, in the shops and foundry division as time study man.

W. S. Hammett of J. E. Dockendorff & Co., New York, returned recently from a visit to Europe, during which he visited the plant of Neuhausen, in Switzerland, which his company represents in this country.

R. M. Hayes, formerly superintendent of the Handford Iron Works, San Bernardino, Calif., has resigned to devote himself to personal interests.

Edward B. Holmes of the E. & B. Holmes Machinery Co., Buffalo, has been elected a director of the Buffalo, Niagara & Eastern Power Corporation.

C. H. Lembcke, secretary of the All-Steel Equipment Co., Aurora, Ill., has returned from a Western trip.

William E. Lindblom has resigned as general works manager of all plants of the Simmons Co., Kenosha, Wis., after being associated with the company for 30 years.

Allan M. Mitchell, newly elected chairman of the Montreal branch of the Canadian Manufacturers' Association, is president of the Robert Mitchell Co., Ltd., Montreal; president of the National Bronze Co., and a director of several other Canadian metal-working concerns.

Edwin P. Papworth, former controller of the Brown Lipe, Chapin Co., Syracuse, N. Y., and for the past year assistant general manager of the McKinnon Industries, Ltd., St. Catherines, Ont., has been appointed vice-president and assistant general manager of the Brown Lipe, Chapin Co., succeeding Samuel H. Cook, resigned.

John S. Payne, president and general manager of the St. Louis branch, Simmons Hardware Co., and vice-president of the Associated Simmons Hardware Co., which controls branches in six cities, will retire on June 1. He has been associated with the organization for 38 years.

Dr. J. G. Pearce, director and secretary of the British Cast Iron Research Association, who recently presented the annual exchange paper of the Institute of British Foundrymen before the convention of the American Foundrymen's Association, spoke on Cast Iron research before the Philadelphia Foundrymen's Associatoin on May 27.

George E. Randles, president of the Foote-Burt Co., Cleveland, Ohio, and a director of the National Machine Tool

Builders' Association, left New York on the S.S. *Mauretania* on May 21, for a two-month business trip to Europe.

R. H. Swanson, sales manager of the Hayes Pump & Planter Co., Galva, Ill., has resigned, effective May 31, to become sales manager for the Peru (Ill.) Plow & Wheel Co. He had been identified with the Hayes sales division five years. His successor has not been named.

Henry A. Taubensee, formerly vice-president and general manager of the Continental Steel Corporation, Kokomo, Ind., has become connected with Taubensee & Richards, Chicago, representatives of the corporation.

C. Sanford Thayer of the executive staff of the Aluminum Corporation of America, at Niagara Falls, N. Y., has been elected president of the Rotary Club of that city.

William J. Weaver, Bridgeport, Conn., has been appointed general sales manager of the Bryant Electric Co., Bridgeport, to succeed Robert M. Eames, who is now general manager.

Obituaries

Charles H. Millet, 59, who succeeded his father, Joshua H. Millett, as president of the Crosby Steam Gage & Valve Co., Boston, died in his home at Malden, Mass., on May 14. He had retired about two years ago because of ill health.

George J. Jobst, 54, vice-president of the Avery Power Machinery Co., Peoria, Ill., member of the contracting firm of V. Jobst & Sons, and prominent in business and commercial life of the city, died on April 11 in his home in Peoria after a brief illness.

Herbert Fraser Walker, 39, vice-president and secretary-treasurer of the Canadian Fairbanks-Morse Co., Ltd., died at his home in Montreal on May 16, after a week's illness. Mr. Walker was also secretary of E. and T. Fairbanks and Co., Ltd., of Sherbrooke, Quebec.

George P. Gerlinger, 59, founder and for many years president of the former Gerlinger Electric Steel Casting Co., and later president and treasurer of the Gerlinger Aluminum & Brass Foundry Co., West Allis, Milwaukee, died on May 14.

Roland H. Boutwell, 77, well-known industrial executive, died on May 14 at his home in Brookline, Mass. He was president of the Boutwell Brothers Co., the Standard Horseshoe Co., and the Portland Iron & Steel Company.

William G. Wherry, 47, president of the Wherry & Hutchinson Electrical Supply Co., and the Skillman Hardware Co., Trenton, N. J., died recently in that city.

William W. Emmett, connected for many years with the foundry department of Emmett & Podas, Los Angeles, died recently, after an illness of several weeks.

Felix J. Weller, founder of the Weller Manufacturing Co., Chicago, died recently at San Bernardino, Calif. Mr. Weller retired about four years ago.

Lynford E. Geer, 61, vice-president and treasurer of the Manitowoc (Wis.) Shipbuilding Corporation, died on May 11 at his home in Chicago.

A. Morris Carey, 69, president of the Carey Machinery & Supply Co., Baltimore, died on May 14.

Edgar Reed, 79, president of the Reed & Prince Manufacturing Co., Worcester, Mass., died on May 20 at his home in Worcester.

Forthcoming Meetings

ASSOCIATED MACHINE TOOL DEALERS—Meeting at Granville Inn, Granville, Ohio, June 4 to 5. A. G. Bryant, 2558 West 16th St., Chicago, is secretary.

NATIONAL ASSOCIATION OF FOREMEN—Convention at Toledo, Ohio, June 6-7. Harry J. Baumker, 316 Tenth St., Toledo, is convention secretary.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS — Semi-annual meeting, Hotel Book-Cadillac, Detroit, June 9 to 12. Calvin W. Rice, 29 West 39th St., New York City, is secretary.

NATIONAL ASSOCIATION OF PURCHASING AGENTS—Fifteenth annual convention, Stevens Hotel, Chicago, June 16-19. "Inform - A - Show" in conjunction. G. A. Renard, 11 Park Place, New York City, is secretary-treasurer.

STEEL INDUSTRY'S EXECUTIVES—Annual Iron & Steel Exposition. Under the sponsorship of the Iron & Steel Electrical Engineers, June 16-20, Broadway Auditorium, Buffalo, N. Y. John F. Kelly, 1010 Empire Bldg., Pittsburgh, Pa., is managing director.

WORLD POWER CONFERENCE—Second annual conference, Berlin, Germany, June 16-25. O. C. Merrill, Edmonds Bldg., Washington, is U. S. chairman.

AMERICAN SOCIETY FOR TESTING MATERIALS—Annual meeting, Haddon Hall, Atlantic City, N. J. June 23-27. C. L. Warwick, 1315 Spruce Street, Philadelphia, is secretary-treasurer.

STEEL FOUNDERS' SOCIETY OF AMERICA—Semi-annual convention, Greenbrier Hotel, White Sulphur Springs, Va., June 26-27. G. P. Rogers, 932 Graybar Bldg., New York City, is managing director.

INTERNATIONAL CONGRESS FOR GENERAL MECHANICS — Liege, Belgium, Aug. 31 to Sept. 7. For information address Alb. Schlag, 4 Place Saint Lumbert, Liege, Belgium.

NATIONAL METAL CONGRESS—Twelfth annual Congress and Exposition, Stevens Hotel, Chicago, Sept 22-26. W. H. Eisenman, secretary of the A.S.S.T., 7016 Euclid Ave., Cleveland, Ohio, is director.

AMERICAN WELDING SOCIETY—Annual fall meeting, Congress Hotel, Chicago, September 22-26. W. M. Spraragen, 29 W. 39th St., New York, N. Y. is technical secretary.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Annual fall meeting of Iron & Steel Division and Machine Shop Practice Division, Stevens Hotel, Chicago, September 22-26. P. T. Wetter, 29 W. 39th St., New York, secretary.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS — Annual fall meeting of Iron & Steel Division, Stevens Hotel, Chicago, September 22-26. T. T. Read, 29 W. 39th St., New York, N. Y., is secretary.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS — Annual fall meeting of the Institute of Metals Division, Stevens Hotel, Chicago, September 22-26. W. M. Corse, 29 W. 39th St., New York, N. Y., is secretary.

AMERICAN SOCIETY FOR STEEL TREATING—Annual Convention, Stevens Hotel, Chicago, September 22-26. W. H. Eischman, 7016 Euclid Ave., Cleveland.

Rise and Fall of the Market

ALL price changes of the week, which occurred in shop materials and supplies listed here, were downward with the exception of a few descriptions of scrap. Materials affected were, blue annealed and galvanized steel sheets, electrolytic copper, straits tin, pig lead, fabricated brass and copper, sheet zinc, linseed oil and furnace coke. The market is quiet in all metals. Pig-iron sales are confined to small lots but the volume is in keeping with the rate of production. Structural steel, at the present price of $1.70 per 100 lb., base, Pittsburgh, has not been so cheap since it was sold at that figure in July, 1922. Steel is still 31c. per 100 lb. above the bottom of the market in the depression of eight years ago.

(All prices as of May 23, 1930)

IRON AND STEEL

PIG IRON—Per gross ton, f.o.b.:

CINCINNATI	
No. 2 Southern (silicon 1.75@2.25)	$16.69@$18.19
Northern Basic	19.89@ 20.39
Southern Ohio No. 2	19.89@ 20.39
NEW YORK—Tidewater Delivery	
No. 2 Southern (silicon 1.75@2.25)	18.00@ 18.50
BIRMINGHAM	
No. 2 Foundry (silicon 1.75@2.25)	14.00
PHILADELPHIA	
Eastern Pa., No. 2x (silicon 2.25@2.75)	20.00
Virginia No. 2	18.75@ 19.25
Basic	22.29
CHICAGO	
No. 2 Foundry, local (silicon 1.75@2.25)	19.00
No. 2 Foundry, Southern (silicon 1.75@2.25)	18.20
PITTSBURGH, including freight charge ($1.76) from Valley:	
No. 2 Foundry	19.63@ 20.13
Basic	19.63@ 20.13
Bessemer	20.76

IRON MACHINERY CASTINGS—Cost in cents per lb. of 100 flywheels, 6-in. face x 24-in. dia., hub not cored, good quality gray iron, weight 275 lb.:

Detroit	4.50
Cleveland	5.00
Cincinnati	4.50
New York	5.25
Chicago	4.50@4.75

SHEETS—Quotations are in cents per pound in various cities from warehouse; also the mill base in large lots:

Blue Annealed*	Pittsburgh Mill Base	Chicago	Cleveland	New York
No. 10	1.90@2.10	3.35†	3.25	3.50@3.60†
No. 12	1.95@2.15	3.45†	3.30	3.55@3.65†
No. 14	2.05@2.25	3.55†	3.40	3.60@3.70†
No. 16	2.15@2.35	3.65†	3.50	3.70@3.80†
Black				
Nos. 18 to 20	2.35@2.45	3.85†	3.55	3.45@3.70
No. 22	2.50@2.60	4.00†	3.70	3.60@3.85
No. 24	2.55@2.65	4.05†	3.75	3.65@3.90
No. 26	2.65@2.75	4.15†	3.85	3.75@4.00
No. 28	2.80@2.90	4.75†	4.00	3.90@4.15
Galvanized				
No. 10	2.50@2.60	3.90†	3.80	3.55@3.80
Nos. 12 to 14	2.60@2.70	4.00†	3.90	3.65@3.90
No. 16	2.70@2.80	4.10†	4.00	3.75@4.00
No. 18	2.85@2.95	4.25†	4.15	3.90@4.15
No. 20	3.00@3.10	4.40†	4.30	4.05@4.30
No. 22	3.05@3.15	4.45†	4.35	4.10@4.35
No. 24	3.20@3.30	4.60†	4.50	4.25@4.50
No. 26	3.45@3.55	4.85†	4.75	4.50@4.75
No. 28	3.70@3.80	5.10†	5.00	4.75@5.00

*Light Plates. †Up to 3,999 lb.

WELDED STEEL PIPE—Warehouse discounts are as follows:

	New York		Cleveland		Chicago	
	Black	Galv.	Black	Galv.	Black	Galv.
1 to 3 in. butt	56.02%	43.48%	53.3%	42.3%	57.3%	44.8%
3½ to 6 in. lap	52. 6%	40.06%	53.3%	40.3%	53.9%	41.4%

WROUGHT-STEEL PIPE LIST

Size, Inches	List Price per Foot	Diameter in Inches—External	Diameter in Inches—Internal	Thickness Inches
⅛	$0.17	1.315	1.049	.133
¼	.23	1.66	1.38	.14
⅜	.27½	1.9	1.61	.145
½	.37	2.375	2.067	.154
⅝	.58½	2.875	2.469	.203
¾	.76½	3.5	3.068	.216
⅞	.92	4 0	3.548	.226
1	1.09	4.5	4.026	.237
1¼	1.48	5.563	5.047	.258
1½	1.92	6.625	6.065	.28
2	2.50	8.625	8.071	.277

SEAMLESS STEEL TUBING—Following net prices are for seamless mechanical tubing, cold drawn, round, .10 to .30 carbon, at New York warehouse in lots of less than 100 ft. or 100 lb.:

Thickness—Decimal Fractions	B.w.g. and	Outside Diameter in Inches—½	⅝	¾	⅞	1	1⅛	1¼
		Price per Foot						
.035"	20	$0.15	$0.16	$0.17	$0.18	$0.19	$0.21	$0.23
.049"	18	.17	.18	.19	.20	.21	.23	.25
.065"	16	.19	.20	.21	.22	.23	.25	.27
.083"	14	.20	.22	.23	.24	.25	.27	.29
.095"	13	.21	.23	.25	.26	.27	.29	.31
.109"	12	.22	.24	.26	.27	.28	.30	.32
.120" or .125"	11	.23	.25	.27	.28	.29	.31	.33
.134"	10	.24	.26	.28	.29	.30	.32	.34

MISCELLANEOUS—Warehouse base prices in cents per lb.:

	New York	Cleveland	Chicago
Spring steel, light*	4.50	4.65	4.65
Spring steel, heavier	4.00	4.00	4.00
Coppered Bessemer rods	6.05	6.00	6
Hoop steel	4.25†	4.00	3
Cold rolled strip steel	6.25	6.00	6
Floor plates	5.10†	5.30	5.00†
Cold drawn, round or hexagon‡	3.40	3.65	3.60
Cold drawn, flat or square‡	3.90	4.15	4.10
Structural shapes	3.30†	3.00	3.10†
Soft steel bars	3.25†	3.00	3.00†
Soft steel bar shapes	3.25†	3.00	3.00†
Soft steel bands	3.75†	3.65	3.20†
Tank plates	3.30†	3.00	3.10†
Bar iron (2.75 at mill)	3.24	3.00	3.00
Drill rod (from list)	60%	55%	50%

*Flat, $\frac{3}{16}$-in. thick by ¾-in. wide. †Up to 3,999 lb., ordered and released for shipment at one time. ‡Cold finished steel, shafting and screw stock.

Electric welding wire at New York warehouse—$\frac{3}{32}$, 8.35c. per lb.; ⅛, 7.85c. per lb.; $\frac{5}{32}$ to ½, 7.35c. per lb.

METALS

Warehouse Delivery Prices in Cents Per Lb. for Small Lots:

Copper, electrolytic, New York			14.50
Tin, Straits, pigs, New York			34.50@35.50
Lead, pigs, E. St. Louis	5.40	New York	6.50@ 7.00
Zinc, slabs, E. St. Louis	4.65	New York	6.25@ 7.25

	New York	Cleveland	Chicago
Antimony, slabs	10.25@10.75	10.50	11.50
Copper sheets*	22.75	22.75	23.75
Copper wire*	15.00	15.62½	15.87½
Copper, drawn, round*	21.25	21.25	22.25
Copper tubing*	25.00	25.00	26.00
Brass sheets, high*	19.75	19.75	20.50
Brass tubing, high*	24.75	24.75	25.50
Brass rods, high*	18.00	18.00	18.75
Brass wire, high*	20.25	20.25	21.00

*Mill, base.

METALS—Continued

	New York	Cleveland	Chicago
Aluminum ingots, 99%	25@26	24.30	24.30
Zinc sheets (casks)	10.25@10.75	11.75	10.11
Solder (½ and ½)	25.75	25.50	26@28

Babbitt metal, delivered in case lots, New York, cents per lb.:

Genuine, highest grade	51.00
Commercial genuine, intermediate grade	37.00
Anti-friction metal, general service	31.00
No. 4 babbitt, f.o.b.	11.00

NICKEL AND MONEL METAL—Price in cents per lb., base, f.o.b. Huntington, W. Va.:

	Nickel	Monel Metal
Sheets, full finished	52.00	42.00
Sheets, cold rolled	60.00	50.00
Strip, cold rolled	55.00	45.00
Rods, hot rolled	45.00	35.00
Rods, cold drawn	50.00	40.00
Tubing	75.00*	90.00†
Angles, hot rolled	50.00	40.00
Plates	52.00	42.00

*Seamless. †Welded.

OLD METALS—Dealers' purchasing prices in cents per pound, f.o.b. cars:

	New York	Cleveland	Chicago
Crucible copper	10.00@10.25	13.50	9.25@ 9.75
Copper, heavy, and wire	9.00@ 9.25	13.00	8.50@ 9.00
Copper, light, and bottoms	7.50@ 7.75	12.00	7.50@ 8.00
Heavy lead	4.00@ 4.12½	5.25	3.50@ 4.00
Tea lead	2.00@ 2.25	3.25	2.50@ 3.00
Brass, heavy, yellow	5.00@ 5.25	8.00	5.00@ 5.50
Brass, heavy, red	7.50@ 7.75	12.50	7.50@ 8.00
Brass, light	4.00@ 4.25	7.00	4.50@ 5.00
No. 1 rod-brass turnings	5.50@ 5.75	8.00	6.00@ 6.50
Zinc	2.00@ 2.25	3.00	1.75@ 2.00

TIN PLATES—Charcoal—Bright—Per box:

"AAA" Grade:	New York	Cleveland	Chicago
IC, 14x20	$12.10	$11.95	$11.50
"A" Grade:			
IC, 14x20	9.70	9.90	9.50
Coke Plates—Primes—Per box:			
100-lb., 14x20	6.45	6.10	7.00
Terne Plates—8-lb. Coating—Small lots—Per box:			
IC, 14x20	7.75@8.00	7.00	7.50

MISCELLANEOUS

	New York	Cleveland	Chicago
Cotton waste, white, per lb.	$0.13	$0.16	$0.15
Cotton waste, colored, per lb.	.09½	.12	.12
Wiping cloths, washed, white, per lb.	.13½	38.00 per M	.16
Sal soda, per lb.	.01¾	.02	.02
Roll sulphur, per lb.	.028	.03½	.04
Linseed oil, raw, in 1 to 4 bbl. lots, per lb.	.146	.164	.15
Cutting oil, about 25% lard, in 5 gal. cans, per gal.	.75	.60	.65
Machine oil, medium-bodied (55 gal. steel bbl.) per gal	.33	.36	.24
Belting—Present discounts from list in fair quantities (½ doz. rolls) for leather or rubber:			
Leather—List price, 24c. per lin.ft., per inch of width, for single ply:			
Medium grade	30–10%	30–10%	35%
Med. grade, heavy wgt	30%	30 –5%	30%
Rubber transmission, 6-in., 6 ply, $1.83 per lin.ft.:			
First grade	50%	50–10%	50%
Second grade	60%	60– 5%	50–10%

Comparative Warehouse Prices

New York	Unit	Current Price	Four Weeks Ago	One Year Ago
Soft steel bars	per lb.	$0.0325	$0.0325	$0.0325
Cold drawn shafting	per lb.	.034	.034	.035
Brass rods	per lb.	.18	.2125	.2125
Solder (½ and ½)	per lb.	.2575	.28	.325
Cotton waste, white	per lb.	.13	.13	.10@.13½
Disks, aluminumoxide mineral, cloth, No. 1 6-in. dia.	per 100	4.59	4.59	3.60
Lard cutting oil	per gal.	.75	.75	.55
Machine oil	per gal.	.33	.33	.33
Belting, leather, medium	off list	30–10%	30–10%	30–10%
Machine bolts, up to 1x30 in., full kegs	off list	50–10%*	50–10%*	50–10%*

*List prices as of April 1, 1927

MISCELLANEOUS—Continued

	New York	Cleveland	Chicago
Abrasive materials — Standard grade, in sheets 9x11 in., No. 1, per ream of 480 sheets:			
Flint paper*	$6.03	$6.03	$6.03
Emery cloth*	25.87	25.87	25.87
Disks, aluminum oxide mineral, 6 in. dia., No. 1, per 100:			
Paper†	2.61	2.61	2.61
Cloth†	4.59	4.59	4.59
Fire clay, per 100 lb. bag	1.00	.75	.75
Coke, prompt furnace, per net ton	Connellsville,		2.50
Coke, prompt foundry, per net ton	Connellsville,		3.50@4.85
White lead, dry	100 lb. kegs	New York,	13.75
White lead, in oil	100 lb. kegs	New York,	14.25
Red lead, dry	100 lb. kegs	New York,	13.75
Red lead, in oil	100 lb. kegs	New York,	15.25

*Less than 3 reams. †Less than 200.

SHOP SUPPLIES

Discounts from new list dated Apr. 1, 1927, applying on immediate deliveries from warehouse stocks in New York and vicinity:

Machine bolts:	
Up to ¾-in. x 6-in., full kegs, list less	60%
Larger, up to 1 x 30-in., full kegs, list less	50–10%
Less than full kegs or case lots, add to list	10%
Fitting-up bolts: list less	45%
Lag screws:	
Up to ½-in. x 6-in., list less	60%
Larger, list less	50–10%
Less than full keg or case lots, add to list	10%
Rivets:	
Structural, round head, full kegs, net	$4.50
Structural, round head, broken kegs, net	6.00
Tank, $\frac{7}{16}$-in. dia. and smaller, list less	60%
Nuts:	
Hot pressed, square or hexagonal, blank or tapped:	
Full kegs up to 1-in., incl., list less	60%
Larger, up to 3-in., list less	40–10%
Less than keg or case lots, add to list	10%
Washers:	
Wrought, full kegs, per 100 lb., list less	$4.00
Wrought, broken kegs, per 100 lb., list less	2.00
Turnbuckles:	
With stub ends, list less	20%
Without stub ends, list less	50%
Chain:	
Proof coil, base, per 100 lb., net	$8.50
Cast iron welding flux, per lb., net	.35
Bronzing flux, per lb., net	.50

MACHINE REQUIREMENTS AND INDUSTRIAL CONSTRUCTION

Equipment Wanted

O., Cleveland—City, W. Hopcraft, City Hall, Purch. Agt.—lathe for Fairmount pumping station.

O., Columbus—Bernard Bros. Auto Service Co., 60 East Long St., J. M. Alexander, Mgr. —lathe, 24 in., automatic machine, automatic drill press and air compressor.

Opportunities for Future Business

Calif., Los Angeles—Southern California Telephone Co., 740 South Olive St., is having plans prepared for the construction of a group of garage buildings. Estimated cost $200,000. Private plans.

Calif., Los Angeles—State of California, received lowest bids for the construction of maintenance stations, including garage, repair shops, bunk house, oil house, etc., in Orange and Ventura counties.

Calif., Los Angeles—E. J. Stanton & Co., c/o Stanton, Reed & Hibbard, Architects Bldg., Archts., are having plans prepared for a 1 and 2 story, 200 x 200 ft. lumber plant on Tweedy Blvd.

Calif., San Francisco—Eng-Skell Co., 208 Mission St., manufacturers of soda water fountains, etc., plans the construction of a factory at Russ and Howard Sts. Estimated cost to exceed $75,000. Architect not selected.

Calif., San Francisco—Pacific Coast Steel Co., 111 Sutter St., plans the construction of four large warehouses at Third and Mariposa Sts.

Calif., Santa Monica—Douglas Aircraft Co. Inc., manufacturers of airplanes, awarded contract for the construction of a 40 x 240 ft. addition to factory.

Conn., Bridgeport—Standard Oil Co. of New York, 154 Admiral St., awarded contract for the construction of a 1 story, 90 x 125 ft. service station on Fairfield Ave. Estimated cost $40,000. Noted Mar. 27.

Conn., Stamford—Norma Hoffman Bearings Co., Hamilton St., awarded contract for a 1 and 2 story, 100 x 200 ft. factory. Estimated cost $125,000.

Conn., Waterbury—American Brass Co., Grand and Meadow Sts., manufacturers of brass tubes, awarded contract for a 1 story, 140 x 160 and 140 x 205 ft. mill on South Main St. Estimated cost $300,000.

Conn., Waterbury—Lux Clock Co., 97 Perry St., awarded contract for the construction of a 4 story, 35 x 80 ft. factory. Estimated cost $75,000. Noted May 1.

Ill., Chicago—Aridor Co., 589 East Illinois St., awarded contract for masonry and carpentry for a 1 and 2 story factory for the manufacture of caps for glass containers at 3228-40 West 48th Pl. Estimated cost $125,000. Noted Apr. 24.

Ill., Chicago—Commonwealth Edison Co., 72 West Adams St., awarded contract for the construction of a 7 story, 254 x 330 ft. service station at California Ave. and Addison St. Estimated cost $1,000,000.

Ill., Chicago — Spurgin Mfg. Co., 7011-13 Vincennes Ave., awarded masonry contract for a 1 story, 50 x 125 ft. factory for the manufacture of office supplies. Estimated cost $16,000. Anderson & Winblad, 6235 South Michigan Ave., Archts.

Ill., Glenwood—Glenwood Manual Training School, is receiving bids for the construction of 1 story administration building. Estimated cost $100,000. E. H. Clark, 8 East Huron St., Archt.

Ill., Momence — Republic Aircraft Co., R. Leving, Pres., 822 West 70th St., Chicago, will soon award contract for the construction of an 87 x 160 ft. factory and 105 x 160 ft. office building at Air Harbor.

Ind., Fort Wayne—Texas Co., awarded contract for the construction of a service station at Williams and Harrison Sts. Estimated cost $41,000.

Ky., Glasgow—School Commissioners, are having plans prepared for the construction of a 2 story, 75 x 112 ft. school including manual training rooms, etc. Estimated cost $150,000. H. E. Boyle & Co., Furniture Bldg., Evansville, Archts.

Me., Bath—General Utilities Co., R. Wharff, Mgr., 199 Exchange St., Bangor, plans the construction of a factory at Donald Yard. Estimated cost $40,000 to $50,000. Private plans.

Md., Baltimore—J. H. Ferguson, 1918 Harford Ave., awarded contract for the construction of a 2 and 3 story, 112 x 200 ft. factory and garage at Elm Ave. and 32nd St. Estimated cost $200,000. Noted May 8.

Mass., Somerville (Boston P. O.)—School Commission, will receive bids June 1 for the construction of a 3 story junior high school including shops, etc., on Vinald Ave. Estimated cost $400,000. J. P. Hefferman and J. M. Gray, 175 High St., Boston, Archts.

Mo., St. Louis—Bd. of Education, 911 Locust St., will soon receive bids for the construction of a 4 story, 101 x 150 ft. shop building at 3400 Thomas St. G. W. Sanger, Acting Comr. of Buildings.

N. J., Elizabeth—J. Skramovsky, 51 Dayton St., will readvertise for bids for a 1 story, 50 x 100 ft. work shop at 10-12 South Spring St. Estimated cost $40,000. J. B. Beatty, 65 North Reid St., Archt. Former bids rejected. Noted Apr. 3.

CONTRACTS LET, INDUSTRIAL PLANTS, U. S.

($40,000 or more -000 omitted)

	Jan. 1 to May 1			
	1930		1929	
	No.	Value	No.	Value
Aircraft	1	$40	12	$2,788
Automotive	7	340	108	8,753
Garages	71	5,413		
Chemicals, fine	3	265	1	250
Chemicals, heavy	12	6,825	14	2,710
Other Process Industries	4	1,330	1	1,000
Clay Products	6	384	12	1,670
Coke	3	1,120	1	150
Cold Storage Warehouses	2	144	8	822
Other Warehouses	33	5,455	21	2,359
Electric Power Plants	61	51,588	36	25,681
Fertilizer	...	.....	1	50
Foundries	8	485	15	2,356
Glass	5	460	5	4,300
Iron & Steel Products	22	15,073	48	20,033
Leather	4	235	4	710
Cement	1	40	2	340
Lumber and Woodworking	8	660	13	3,765
Machine Shops	25	1,592	22	7,917
Manufactured Gas	3	370	3	810
Oils, Veg. & Animal	1	250	...	.....
Paint & Varnish	4	365	4	205
Paper & Pulp	4	1,435	9	800
Petroleum Products	16	2,605	8	46,385
Printing & Binding	15	3,780	17	1,219
Pyroxylin Products	1	40	1	2,000
Radio	1	125	8	1,019
Rayon	1	75	1	110
Other Textiles	11	855	36	4,279
Rubber Products	5	607	9	2,695
Soap	1	1,500	4	600
Sugar	...	.....	2	240
Other Food Products	92	8,498	80	14,496
Misc. Factories	115	13,285	211	30,760
Total	546	$125,239	717	$191,272

N. J., Harrison—Driver-Harris Co., Middlesex St., will receive bids about June 15 for the construction of a 1 and 2 story addition to factory for the manufacture of wire products. Estimated cost $250,000. J. A. Finegan, 776 Broad St., Newark, Archt. Noted Apr. 10.

N. J., Jersey City—Adam Black & Sons Inc., 54 Cambridge Ave., awarded contract for the construction of a 1 story, 150 x 260 ft. automobile body manufacturing plant on Tonnelle Ave. Estimated cost $100,000.

N. J., Montclair—L. White, c/o A. E. Ramhurst, 516 Bloomfield Ave., Archt., is having plans prepared for the construction of a 2 story, 100 x 165 ft. garage, etc., at Grove and Glenride Sts. Estimated cost $150,000.

N. J., North Bergen—Wilson Welder & Metal Co. Inc., Terminal Bldg., Hoboken, awarded contract for the construction of a 1 story, 145 x 205 ft. factory at 38th St. and Bergen Turnpike here. Estimated cost $40,000.

N. Y., Flushing—C. McLaughlin, 237 Main St., is having sketches made for a 75 x 384 ft service garage at 48th Ave. and 211th St. Estimated cost $100,000.

N. Y., Glendale—Phil Dietz Coal Co., Ridgewood, will receive bids in Spring of 1931 for the construction of a 119 x 127 ft. garage and shop at 62nd St. and 74th Ave. Estimated cost to exceed $40,000. H. C. Brucker, 2424 Myrtle Ave., Archt. Project awaiting action of Bd. of Standards and Appeals. Noted Apr. 24.

N. Y., Long Island City—A. Brisbane, c/o Merole Bros., 2376 First Ave., New York, will not construct a garage at 43rd Ave. and Rawson St. $50,000. Project in abeyance. Noted Mar. 6.

N. Y., Long Island City—Mymand Construction Co., 6730 75th St., Middle Village, will receive bids late in fall for the construction of a 100 x 100 ft. service garage at 39th St. and Nelson Ave. here. Estimated cost $40,000. M. Perlstein, 6735 75th St., Middle Village, Archt. Work will be done by separate contracts. Noted May 15.

N. Y., Long Island City — Welsh Bros., 27 Purvis St., is haying sketches made for a 1 story, 140 x 200 ft. service garage at 47th Ave. and 36th St. Estimated cost $50,000. J. Baker, 9 Jackson Ave., Archt.

N. Y., New York — Halpern Construction Corp., 450 East Fordham Rd., will receive bids late in fall for the construction of a 2 story, 100 x 100 ft. garage and service station at 172nd St. and Jerome Ave. Estimated cost $70,000. G. W. Swiller, 4215 3rd Ave., Archt. Work will be done by separate contracts. Noted May 15.

N. Y., New York—Kenport Construction Co., H. S. Sylvester, Pres., 1816 East 17th St., Brooklyn, will receive bids in fall for the construction of a 2 story garage, service station, etc., at Morris Park and Paulding Ave. Estimated cost $50,000. L. Pisciotta, 1912 Arthur Ave., Archt. Noted May 15.

O., Cleveland—Newman Mfg. Co., I. Newman, 403 Western Reserve Bldg., manufacturers of wholesale novelties, awarded contract for the construction of a 4 story, 31 x 115 ft. factory at 1293 West 95th St., Estimated cost $40,000. Noted Apr. 17.

O., Columbus—H. H. Helmick and A. Prout, awarded contract for a 1 story, 62 x 187 ft. garage at 66 South Third St. Estimated cost $40,000.

Pa., Philadelphia—C. Kahn, Provident Trust Bldg., plans the construction of a 1 story, 42 x 76 and 52 x 67 ft. factory at Slokely and Westmoreland Sts. Estimated cost $50,000. E. A. Stopper, 10 South 18th St., Archt. Ryan Scully Co., Wissahicken and Yelland Sts., manufacturers of furnaces, lessee.

Pa., Pittsburgh—Keystone Box Co., M. H. Nolan, Pres. and Treas., 28th and Smallman Sts. (packing) will soon award contract for a 1 story, 20 x 100 ft. factory. P. Dietz, 611 Penn Ave., Archt. and Engr.

R. I., Newport—Short Line Bus Co., W. H. Vanderbilt, Pres., is having plans prepared for the construction of a 1 story bus terminal. Estimated cost $50,000. E. M. Corbett, 167 Bedford St., Archt.

R. I., Providence—What Cheer Garage Co., Benefit St., awarded contract for the construction of a 3 story, 65 x 75 ft. repair and service garage at Benefit and Meeting Sts. Estimated cost $40,000. Noted May 8.

Ont., Chippewa — Norton Co. Ltd., awarded contract for a 2 story addition to abrasive manufacturing plant. Estimated cost $60,000.

Ont., Toronto—J. & J. Taylor Co. Ltd., 133 Front St. East, awarded contract for a 1 story addition to machine shop. Estimated cost $50,000.

Ont., Toronto — Toronto Transportation Comn., 35 Yonge St., plans a 2 or 3 story addition to garage on Davenport Rd. Estimated cost $150,000. D. W. Harvey, 35 Yonge St., Engr.

Ont., Waterloo—Sunshine Waterloo Co. Ltd., plans the construction of a 1 story plant for the manufacture of threshing machines. Estimated cost $200,000. T. Pringle & Son, Confederation Life Bldg., Toronto, Engrs.

Ont., Welland—Page-Hersey Tubes Ltd., 100 Church St., Toronto, awarded contract for foundation for a 1 story, 75 x 800 ft. plant for the manufacture of tubes, pipes, etc., here. Estimated cost $2,000,000. Noted May 15.

Que., Jolliette — General Conveyors Ltd., plans the construction of a plant for the manufacture of pneumatic tubes. Estimated cost $40,000. Noted May 1.